最終報告書

硫化亜鉛のラットを用いた経口投与による

28 日間の反復投与毒性試験

(試験番号：B000875)

2001 年 7 月 10 日

株式会社三菱化学安全科学研究所

陳述書

試験委託者：　経済産業省(旧通商産業省)　製品評価技術センター

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本試験は，下記の基準に従い実施したものである．

OECD Principles of Good Laboratory Practice, Decision of the council concerning mutual acceptance of date in the assessment of chemicals (1997)

[redacted]

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本試験は試験計画書および標準操作手順書に従って実施され，本報告書には試験に使用した方法，手順が正確に記載されており，試験結果は生データを正確に反映していることを下記の通り確認した．

[redacted]

調 査 内 容		実施者	実 施 日	試験責任者への報告日	運営管理者への報告日
試験計画書	草案	[redacted]	2000年11月9日	2000年11月9日	2000年11月9日
	最終版		2000年11月14日	2000年11月14日	2000年11月14日
試験計画書変更書	(1)		2000年12月4日	2000年12月4日	2000年12月4日
試験実施状況	投与		2000年11月30日	2000年12月4日	2000年12月4日
	行動検査		2000年12月12日	2000年12月13日	2000年12月14日
	尿検査		2000年12月22日	2000年12月22日	2000年12月22日
	剖検・器官重量測定・採血		2000年12月28日	2001年1月4日	2001年1月5日
生データ・報告書草案			2001年4月13日～2001年4月16日	2001年4月16日	2001年4月17日
			2001年4月20日	2001年4月20日	2001年4月20日
最終報告書			2001年7月10日	2001年7月10日	2001年7月10日

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試験実施概要

1. 表　　題：　硫化亜鉛のラットを用いた経口投与による 28 日間の反復投与毒性試験
(試験番号：B000875)

2. 試 験 目 的：　硫化亜鉛をラットに 28 日間毎日反復投与し，現れる生体の機能および形態の変化を観察し，その毒性と回復性を明らかにする．

3. 適用ガイドライン：
OECD Guideline for Testing of Chemicals (No.407，1995)

4. 適用 GLP：　OECD Principles of Good Laboratory Practice, Decision of the council concerning mutual acceptance of date in the assessment of chemicals (1997)

5. 試験委託者：　経済産業省(旧通商産業省)　製品評価技術センター
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6. 試験受託者：　株式会社三菱化学安全科学研究所
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（投与液の均一性・濃度分析のみ以下の試験施設にて実施）
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9. 分担責任者：

10. 試験従事者：

[redacted]

11. 試 験 日 程：

試験開始	2000 年 11 月 14 日
動物入荷	2000 年 11 月 22 日
投与開始	2000 年 11 月 30 日
投与期間終了後解剖	2000 年 12 月 28 日
回復期間終了後解剖	2001 年 1 月 11 日
試験終了	2001 年 7 月 10 日

12. 保　　管：試験計画書，標本，生データ，被験物質，記録文書および最終報告書は，鹿島研究所の保管施設に保管する．保管期間は，最終報告書提出後 10 年間とし，以後の保管は試験委託者と協議の上，決定する．

試験責任者署名

試験委託者：　経済産業省(旧通商産業省)　製品評価技術センター

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要約

硫化亜鉛（Zinc Sulfide，略称 ZnS）を 0，40，200 および 1000 mg/kg の用量で雌雄の Crj:CD(SD)IGS ラット(SPF)に 28 日間反復経口投与し，現れる生体の機能および形態の変化を観察した．

被験物質投与に起因すると思われる変化は認められなかった．

一般状態観察で痂皮形成，掻創が雄の投与群に認められたが，用量が大きくなるにつれて頻度が高くはならなかったこと，雌では全く認められていないことから，被験物質投与に起因する変化ではないと判断した．また脱毛が雌雄で散見されたが，その発現頻度から被験物質投与に起因する変化ではないと判断した．

行動検査の詳細な一般状態観察で認められた外傷も上記と同一個体であり，被験物質投与に起因する変化ではないと判断した．

血液学的検査で認められた，雌の 40 および 1000 mg/kg 群の好中球分葉核球比の低値は，白血球数に有意な変動が認められていないこと，背景データ（添付資料 2）と比較して通常変動範囲内の変化であり，今回の対照群の値がやや高めであることから，被験物質投与とは関連のない偶発的変化と判断した．

投与期間終了時の検査で 200 mg/kg 群の雌に認められた胸腺の相対重量の高値は，1000 mg/kg 群では認められていないことから，被験物質投与とは関連のない偶発的変化と判断した．また，回復期間終了時の検査で 1000 mg/kg 群の雌に認められた脾臓の絶対重量および相対重量の高値は，投与期間終了時には認められていないこと，血液学的検査で赤血球系に異常は認められなかったことから，被験物質投与とは関連のない偶発的変化と判断した．

以上の結果から，雌雄ともに 1000 mg/kg 群で被験物質投与に起因すると思われる変化は認められなかったため，本試験条件下における硫化亜鉛（ZnS）の無影響量（NOEL）は，雌雄ともに 1000 mg/kg と結論した．

緒言

硫化亜鉛は主にリトポン顔料製造（リトポン lithopone = Griffith's zinc white[1)]：組成 ZnS；28%，$BaSO_4$；72%で塗料，リノリウム，人工皮革で使用する）で，その他の用途としてX線，テレビスクリーン，発光時計のりん光体などで使用されている[II)]．

今回，化学物質ハザードデータベース構築にあたり，データベース化対象の一つである日本国内の高生産量化学物質のハザードデータを整備するために，硫化亜鉛の 28 日間反復経口投与試験を実施したのでその結果を報告する．

材料および方法

1. 被験物質

経済産業省（旧通商産業省）製品評価技術センターから提供された硫化亜鉛（略称：ZnS，ロット番号：[redacted] 純度[III]：98.1%，製造元：[redacted] を使用した．被験物質は下記の物性を有する無臭の微緑ー白色粉末[IV]である．被験物質入手後は冷蔵・暗所・気密条件下で保存した．試験に使用したロットの安定性の確認は，被験物質の特性から安定であると判断し，実施しなかった．

CAS No.：1314-98-3[IV]

分子量：97.45[V]

安定性：通常の使用において安定[IV]

融　点：1180℃で昇華[IV]

沸　点：昇華[IV]

比　重：4.06[IV]

溶解性：0.688mg/水 100mL(18℃) [IV]

その他：希塩酸，希硫酸に可溶．水を含んだ状態では空気中で徐々に酸化されて硫酸亜鉛を生じる[IV]．

2. 試験動物

日本チャールス・リバー株式会社から 2000 年 11 月 22 日に Crj:CD(SD)IGS ラット（SPF）雌雄各 39 匹を入手し，そのうち雌雄各 36 匹を使用した．

動物入荷後，雌雄とも 8 日間の検疫・馴化期間中，毎日一般状態を観察して，健康状態が良好なことを確認した．投与開始前々日に体重層別化無作為抽出法によって，各群の平均体重がほぼ均一となるように群分けした．投与開始時の週齢は 5 週齢，体重範囲は雄が 167～199 g，雌が 136～161 g であった．個別の体重範囲が，平均体重±20 %以内であることを確認した．

動物は，背部皮下に動物番号を登録したマイクロチップを埋め込み，マイクロチップリーダー(DAS-5002 Notebook™ System，BioMedic Data Systems，Inc．)を用いて個体識別した．ケージには試験番号，被験物質名，動物番号，試験種，性別，用量，投与期間，系統および動物種を記載したラベルを付けた．ただし，行動検査時には検査番号のみのケージラベ

ルを付けた.

3. 動物飼育

検疫・馴化期間を含む全飼育期間を通じて，温度 22±2℃（許容範囲 19～25℃），相対湿度 55±15%（許容範囲 35～75%），換気約 12 回／時，照明 12 時間／日（7:00-19:00）に自動調節した飼育室を使用した．飼育期間中の温湿度の実測値は 21.3～23.4℃，47.8～64.3%であった.

動物を滅菌済の実験動物用床敷（ベータチップ，日本チャールス・リバー㈱）を敷いたポリカーボネート製ケージ（265W×426D×200Hmm，トキワ科学器械㈱）内で飼育した．群分け前は 1 ケージあたり 4～5 匹（同性），群分け後は 1 ケージあたり 1 匹収容し，スチール製架台（トキワ科学器械㈱）上に配置して飼育した．ケージの配置場所は，週 1 回ローテーションした．給餌には滅菌済ステンレス製固型飼料用給餌器（トキワ科学器械㈱）を，給水には滅菌済ポリカーボネート製給水瓶（500 および 700 mL，トキワ科学器械㈱）を使用した．ケージ（含床敷），給餌器および給水瓶は週 1 回交換した.

動物には，実験動物用固型飼料（MF，オリエンタル酵母工業㈱）と，5 μm のフィルター濾過後，紫外線照射した水道水を自由に摂取させ，週 1 回交換した.

床敷と飼料中の残留農薬等の汚染物質濃度が，当研究所で定めた基準に適合していることを確認した．また，飲用水は水道法に準拠した水質検査を定期的に実施し，分析値が基準に適合していることを確認している.

4. 投　与

投与経路は，OECD ガイドラインに準じて経口投与とした．投与期間は 28 日間とし，注射筒に装着した胃ゾンデを用いて 1 日 1 回，午前中に強制経口投与した.

本試験の用量設定のために実施した 7 日間反復投与予備試験（用量：0，100，500，1000 mg/kg，動物数：各群雌雄 3 匹，ただし投与液は用時調製）の結果，一般状態，体重，血液学的検査，器官重量(脳，胸腺，肝臓，腎臓，脾臓，副腎，精巣，卵巣)，剖検所見に異常は認められなかった．これらの結果から，本試験の高用量は 1000 mg/kg とし，以下公比 5 で 200 および 40 mg/kg の計 3 用量群を設定した．また，溶媒（0.5%CMC-Na 水溶液）のみを投与する群を設けた．投与液量は 10 mL/kg とし，至近日に測定した体重に基づいて各動物の投与液量を算出した.

被験物質は溶媒（0.5%CMC-Na 水溶液：CMC-Na，関東化学㈱；Lot No.009G1773）に乳鉢を用いて懸濁調製した．調製頻度は週1回とし，投与に供するまで12日間を限度に冷蔵・暗所に保存した．投与液中の被験物質の均一性を 4.0 および 100 mg/mL の濃度で確認した．また，初回調製時に各用量群の投与液を分析し，設定濃度±10%以内であることを確認した(非 GLP 下にて実施．添付資料 1)．投与液中の被験物質の安定性分析は，その物性から判断し，実施しなかった．

対照群および 1000 mg/kg 群の一部の動物に，投与期間終了後 14 日間の回復期間を設けた．

5. 群構成

群　名	投与期間終了後解剖 [1]		回復期間終了後解剖 [2]	
	雄	雌	雄	雌
対　照	6 [3] (10101～10106)[4]	6 (50101～50106)	6 (10107～10112)	6 (50107～50112)
40 mg/kg	6 (10201～10206)	6 (50201～50206)	-	-
200 mg/kg	6 (10301～10306)	6 (50301～50306)	-	-
1000 mg/kg	6 (10401～10406)	6 (50401～50406)	6 (10407～10412)	6 (50407～50412)

1)，第 29 日に解剖；2)，第 43 日に解剖；3)，動物数；4)，動物番号

6. 観察・測定項目

下記の項目を検査した．なお，日と週の表記は投与開始日を第 1 日，第 1～7 日を第 1 週とした．また，第 29 日以降を回復期間とした．

6.1 一般状態

投与期間は 1 日 2 回（投与前，後），その他の期間は 1 日 1 回午前中に観察した．

6.2 行動検査

全動物について，以下の(1)の項目を投与開始前に 1 回，投与期間中に毎週 1 回，午後に検査した．(2)～(4)の項目の検査は第 4 週の午後に実施した．(1)～(2)の項目については，検査番号と動物番号の対応を伏せたブラインド検査にするとともに，可能な限り当該試験の投与および観察に従事していない者が実施した．(1)～(4)の項目の詳細は下記に，スコアリング法は，添付資料 3 に示す．

(1) 詳細な一般状態観察

下記の項目について，ホームケージ外での観察を動物を手にとった時に，その後にオープンフィールド内で2分間の観察を行った．

ホームケージ外：皮膚(外傷，皮膚の色)，被毛(被毛の汚れ，被毛の状態)，眼(眼球突出，眼瞼の開き具合)，粘膜(粘膜の色)，分泌物，流涎，流涙，ハンドリングに対する反応，瞳孔径

オープンフィールド内：排泄物(下痢，多尿)，自律機能(姿勢，立毛，呼吸，歩行，痙攣)，常同行動，異常行動

(2) 刺激に対する反応の観察

下記の項目をオープンフィールド内で観察した．

接近反応，聴覚反応，空中正向反射

(空中正向反射については2回行い異常の有無を確認した．)

(3) 握力測定

握力測定装置(ストレインゲージ DPS-5[デジタルフォースゲージ]，㈱イマダ)を用いて，前肢握力，後肢握力をそれぞれ測定した．なお，測定は2回行い平均値を記載した．

(4) 自発運動量の測定

自発運動量測定装置(SUPERMEX(SM-36)，室町器械㈱)を用い1時間測定した．なお，測定値は測定開始から10分毎に集計した．

投与期間中の検査の結果，被験物質の影響を疑わせる変化が認められなかったため，回復期間の検査は行わなかった．

測定機器　(3)：握力測定装置(ストレインゲージ DPS-5[デジタルフォースゲージ])，㈱イマダ
(4)：自発運動量測定装置(SUPERMEX，SM-36)，室町器械㈱

6.3 体　重

全例の体重を電子上皿天秤（EB-3200S，㈱島津製作所）を用いて，第1，8，15，22，28，29，36および42日に測定した．

6.4 摂餌量

各ケージごとに風袋込み重量を電子上皿天秤（EB-3200S，㈱島津製作所）を用いて週1回（最長7日間，最短4日間）測定し，1匹あたりの1日平均摂餌量を算出した．

6.5 血液学的検査

第29日および第43日の計画解剖時に全対象動物を前日夕方より絶食し，チオペンタールナトリウム（ラボナール，田辺製薬㈱）を腹腔内投与して麻酔し，後大静脈より採

血した．採取した血液を用いて次に示す項目を測定した．(9)，(10)の測定には，凝固阻止剤として3.2w/v%クエン酸三ナトリウム水溶液を使用し，遠心分離して得られた血漿を用いた．その他の項目の測定には，凝固阻止剤EDTA-2Kで処理した血液を用いた．

	項　目	方　法
(1)	赤血球数(RBC)	シースフロー DC インピーダンス検出法
(2)	ヘモグロビン濃度(Hb)	SLS ヘモグロビン法
(3)	ヘマトクリット値(Ht)	赤血球パルス波高値検出法
(4)	平均赤血球容積(MCV)	(1)，(3)より算出
(5)	平均赤血球血色素量(MCH)	(1)，(2)より算出
(6)	平均赤血球血色素濃度(MCHC)	(2)，(3)より算出
(7)	網赤血球数	アルゴンレーザーを用いたフローサイトメトリー法
(8)	血小板数(PLT)	シースフローDCインピーダンス検出法
(9)	プロトロンビン時間(PT)	Quick一段法
(10)	活性化部分トロンボプラスチン時間(APTT)	活性化セファロプラスチン法
(11)	白血球数(WBC)	RF/DC インピーダンス検出法
(12)	白血球百分率	Wright染色塗抹標本について測定

測定機器

(1)～(3)，(8)，(11)　：NE-4500（シスメックス㈱）
(7)　：R-2000（シスメックス㈱）
(9)，(10)　：KC 10A（アメルング社）
(12)　：MICROX HEG-50（オムロン㈱）

6.6 血液生化学的検査

計画解剖時に採取した血液の一部を室温で約30分間静置後遠心分離し，得られた血清を用いて下記の項目を測定した．

	項　目	方　法
(1)	ASAT (GOT)	UV-rate 法 (JSCC 改良法)
(2)	ALAT (GPT)	UV-rate 法 (JSCC 改良法)
(3)	γGT	γ-グルタミル-p-ニトロアニリド基質法 (SSCC 改良法)
(4)	ALP	p-ニトロフェニルリン酸基質法 (JSCC 改良法)
(5)	総ビリルビン	酵素法 (BOD 法)
(6)	尿素窒素	酵素-UV 法 (Urease-GLDH 法)
(7)	クレアチニン	Jaffé 法
(8)	グルコース	酵素-UV 法 (GlcK-G6PDH 法)
(9)	総コレステロール	酵素法 (CES-CO-POD 法)
(10)	トリグリセライド	酵素法 (LPL-GK-G3PO-POD 法)
(11)	総蛋白	Biuret 法
(12)	アルブミン	BCG 法
(13)	A/G 比	(11)および(12)より算出
(14)	カルシウム	OCPC 法
(15)	無機リン	酵素法 (PNP-XOD-POD 法)
(16)	ナトリウム	イオン選択電極法
(17)	カリウム	イオン選択電極法
(18)	クロール	イオン選択電極法

測定機器

(1)～(18)：日立 736-10 形（㈱日立製作所）

6.7 尿検査

各群雌雄 6 匹の新鮮尿を投与期間中の第 23 日(第 4 週)および回復期間中の第 37 日(第 6 週)に採取して，下記の項目を測定した．

項　目	
(1) pH	試験紙法(マルティスティックス，バイエル　メディカル㈱)
(2) 蛋白	試験紙法(マルティスティックス，バイエル　メディカル㈱)
(3) グルコース	試験紙法(マルティスティックス，バイエル　メディカル㈱)
(4) ケトン体	試験紙法(マルティスティックス，バイエル　メディカル㈱)
(5) ビリルビン	試験紙法(マルティスティックス，バイエル　メディカル㈱)
(6) 潜血	試験紙法(マルティスティックス，バイエル　メディカル㈱)
(7) ウロビリノーゲン	試験紙法(マルティスティックス，バイエル　メディカル㈱)

測定機器

(1)～(7)：クリニテック 100（バイエル メディカル㈱）

6.8 病理学的検査

(1) 器官重量

全動物の下記の器官重量を電子上皿天秤（AEG-120，㈱島津製作所）を用いて測定した．また，解剖日の体重に基づいて相対重量（対体重比）を算出した．

肝臓，腎臓，副腎，精巣，精巣上体，卵巣，胸腺，脾臓，脳，心臓

(2) 病理解剖検査

全動物について，採血後，腹大動脈を切断・放血し，安楽死させた後剖検した．

(3) 病理組織学的検査

全動物の下記の器官・組織を採取し，10%中性リン酸緩衝ホルマリン液で固定し，保存した．ただし，精巣および精巣上体はブアン液（Bouin 液）で，眼球とハーダー腺はダビドソン液（Davidson 液）でそれぞれ固定後，10%中性リン酸緩衝ホルマリン液中に保存した．

脳(大脳，小脳および橋を含む部位)，脊髄，胃，十二指腸，空腸，回腸(パイエル板を含む)，盲腸，結腸，直腸，肝臓，腎臓，副腎，脾臓，心臓，胸腺，眼球・ハーダー腺，下垂体，甲状腺(上皮小体を含む)，気管および肺，精巣，精巣上体，前立腺，卵巣，子宮，膣，膀胱，下顎リンパ節，腸間膜リンパ節，坐骨神経，骨髄(大腿骨)，肉眼的病変部

病理組織学的検査は，投与期間終了時解剖動物の雌雄の対照群と 1000 mg/kg 群の上記の採材器官･組織および全試験動物の肉眼的異常部位について常法に従ってヘマトキシリン･エオジン染色標本を作製し，鏡検した．標本作製の過程において動物番号 10401

と 50404 の片側上皮小体が消失したため，これらについては片側のみ組織学的検査を行った．

7. 統計学的解析

計量データは，多重比較検定法で統計学的有意性を解析した．すなわち Bartlett 法で等分散性の検定を行い，分散が等しい場合は一元配置分散分析，分散が等しくない場合は Kruskal-Wallis の検定を行った．群間に有意差が認められた場合は Dunnett 法または Dunnett 型の多重比較検定を行った．計数データは a×b の χ^2 検定を行い，有意差が認められた場合は Armitage の χ^2 検定で対照群と各用量群を比較した．

統計学的解析の対象項目は下記のとおりである．一般状態，行動検査(詳細な一般状態観察，刺激に対する反応の観察)および病理解剖検査については，統計学的解析を実施しなかった．

多重比較検定：体重，摂餌量，血液学的検査，血液生化学的検査，器官重量（絶対重量，相対重量），行動検査計量データ（前肢握力，後肢握力，自発運動量）

χ^2 検定　：尿検査（pH，蛋白，グルコース，ケトン体，ビリルビン，潜血，ウロビリノーゲン），病理組織学的検査

結果

1. 一般状態 (Table 1)

前肢の脱毛が対照群の雄 2 例, 40 mg/kg 群の雌 1 例, 200 mg/kg 群の雄 1 例, 1000 mg/kg 群の雌 1 例に認められた. また痂皮形成が 40 mg/kg 群の雄 2 例, 200 mg/kg 群の雄 1 例, 掻創および痂皮形成, あるいは掻創, 痂皮形成および脱毛が 1000 mg/kg 群の雄 2 例で認められた.

2 行動検査 (Figure 1, Table 2, 3, 4, 5)

投与期間中のハンドリング観察の結果, 第 2 週から第 4 週に 40, 200 および 1000 mg/kg 群の雄 1～2 例に外傷が認められた. オープンフィールド内観察, 刺激に対する反応, 握力および自発運動量測定では, 異常は認められなかった.

3. 体重 (Figure 2, Table 6)

被験物質投与に起因すると思われる変化は認められなかった.

4. 摂餌量 (Table 7)

被験物質投与に起因すると思われる変化は認められなかった.

5. 血液学的検査 (Table 8)

投与期間終了時の検査で, 対照群と比較して有意な好中球分葉核球比の低値が 40 および 1000 mg/kg 群の雌で認められた.

6. 血液生化学的検査 (Table 9)

被験物質投与に起因すると思われる変化は認められなかった.

回復期間終了時の検査で対照群と比較して有意なアルカリフォスファターゼの低値が 1000 mg/kg 群の雄で, ASAT(GOT)の低値が 1000 mg/kg 群の雌で認められた. これらの変化は, 投与期間終了時の検査に認められなかったことから, いずれも被験物質投与とは関連のない変化と判断した.

7. 尿検査 (Table 10)

被験物質に起因すると思われる変化は認められなかった.

投与期間および回復期間（第 4 週および第 6 週）の検査で，対照群と被験物質投与群との間に有意な差は認められなかった

8. 器官重量 (Table 11，12)

投与期間終了時の検査で対照群と比較して有意な胸腺の相対重量の高値が 200 mg/kg 群の雌で認められた．しかし 1000 mg/kg 群では認められていないことから，被験物質投与とは関連のない偶発的変化と判断した. また回復期間終了時の検査で対照群と比較して有意な脾臓の絶対重量および相対重量の高値が 1000 mg/kg 群の雌で認められた.

9. 剖検所見 (Table 13，14)

被験物質に起因すると思われる変化は認められなかった.

偶発的変化として，投与期間および回復期間終了後解剖動物において，脾臓の副脾および瘢痕，肝臓の横隔膜面結節，肺の褐色斑，腎臓の嚢胞，精巣および精巣上体の小型，甲状腺の結節，皮膚の痂皮および脱毛が散発的に認められた.

10. 組織学的所見 (Table 15，16)

被験物質に起因すると思われる変化は認められなかった.

偶発的変化として，脾臓の小肉芽腫，肺の泡沫細胞集簇および限局性出血，腺胃の限局性炎症性細胞浸潤，肝臓の門脈域肝細胞脂肪化，限局性炎症性細胞浸潤，小肉芽腫および限局性肝細胞壊死，腎臓の好塩基性尿細管，嚢胞，腎盂拡張，近位尿細管上皮の硝子滴，限局性炎症性細胞浸潤ならびに間質の限局性リンパ球浸潤，精巣のび漫性精細管萎縮および間細胞のび漫性増生，精巣上体の精子数の減少および限局性リンパ球浸潤，前立腺の限局性炎症性細胞浸潤，卵巣の卵胞嚢胞および黄体嚢胞，子宮の腔拡張，膣の粘膜増生およびび漫性炎症性細胞浸潤，甲状腺の異所性胸腺組織および鰓後体遺残，副腎の束状帯細胞の脂肪滴増加，皮膚の毛胞萎縮，痂皮，皮膚炎ならびに皮下織の限局性炎症性細胞浸潤が認められた．このうち，200 mg/kg 群の雄でみられた腎臓の嚢胞については統計学的に有意差が認められたが，肉眼的に異常の見られた動物についてのみ検査したことによる見かけの有意差と判断した．また，剖検時に瘢痕が認められた動物番

号 10305 の脾臓では，組織学的変化は認められなかった．

考察および結論

硫化亜鉛を 0，40，200 および 1000 mg/kg の用量で雌雄の Crj:CD(SD)IGS ラット(SPF)に 28 日間反復経口投与し，現れる生体の機能および形態の変化を観察した．

被験物質投与に起因すると思われる変化は認められなかった．

一般状態観察で痂皮形成，掻創が投与期間中に対照群を除く雄の投与群に認められた．しかし痂皮形成は雄の 40，200 および 1000 mg/kg 群でそれぞれ 6 例中 2 例，6 例中 1 例，12 例中 2 例と，用量が大きくなるにつれて頻度が高くなる傾向はみられなかったこと，1000 mg/kg 群で認められた 2 例は第 27 日に痂皮形成部位が減少または消失していること，雌では全く認められていないことから，被験物質投与に起因する変化ではないと判断した．掻創は雄の 1000 mg/kg 群の 2 例で，いずれも第 14 日のみに一時的に認められたもので，翌日には痂皮形成に程度が回復していることから，被験物質投与に起因すると思われる変化ではないと判断した．また脱毛が雌雄で散見されたが，その発現頻度から被験物質投与に起因する変化ではないと判断した．

行動検査の詳細な一般状態観察で認められた外傷も上記と同一個体であり，同じ理由で被験物質投与に起因する変化ではないと判断した．

血液学的検査で認められた，雌の 40 および 1000 mg/kg 群の好中球分葉核球比の低値は，白血球数に有意な変動が認められていないこと，背景データ（添付資料 2）と比較して通常変動範囲内の変化であり，今回の対照群の値がやや高めであることから，被験物質投与とは関連のない偶発的変化と判断した．

回復期間終了時の検査で 1000 mg/kg 群の雌に認められた脾臓の絶対重量および相対重量の高値は，投与期間終了時には認められていないこと，血液学的検査で赤血球系に異常は認められなかったことから，被験物質投与とは関連のない偶発的変化と判断した．

以上の結果から，雌雄ともに 1000 mg/kg 群で被験物質投与に起因すると思われる変化は認められなかったため，本試験条件下における硫化亜鉛（ZnS）の無影響量（NOEL）は，雌雄ともに 1000 mg/kg と結論した．

参考文献

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Ⅱ)： 内藤裕史，横手規子　監訳，“化学物質毒性ハンドブック　第Ⅲ巻，27.38 亜鉛”，pp.313-318，2000，丸善㈱，東京

Ⅲ)： [redacted] 試験成績書（平成 12 年 10 月 6 日）

Ⅳ)： [redacted] MSDS（製品安全データシート），No.[redacted] 平成 10 年

Ⅴ)： The Merck Index，eleventh edition(1989)，p.1601

特記事項

(1) 試験の信頼性に悪影響を及ぼす疑いのある予期しえなかった事態

なし.

(2) 試験計画書に従わなかったこと

①試験計画書では検疫期間「7 日間」と記載したが，実際は投与開始日を含め「8日間」検疫した．しかし，投与開始日に最終検疫終了後，投与することを考慮せず記載したためであり，試験成績には影響しなかったと判断した.

②試験計画書では給水瓶のサイズを「700 mL」と記載したが，投与および回復期間中は個別飼育であったため 500 mL の給水瓶を使用した．しかし，このことにより試験成績には影響は無かったと判断した.

③試験計画書では投与液を投与に供するまで冷蔵・暗所に 8 日間を限度に保存すると記載したが，投与開始週に限り調剤後 12 日間冷蔵・暗所に保存し，投与に供した．しかし，被験物質の物性から投与液中で変化するとは考えられないことから，試験成績に影響は無かったと判断した.

④試験計画書では病理組織学的検査対象器官として「骨（大腿骨)」は含めていなかったが，「骨髄（大腿骨)」と同時に鏡検した．しかし，この事象により試験成績に影響は無かったと判断した.

⑤試験計画書では体重の

添付資料 1

1.投与液の均一性の確認

硫化亜鉛投与液の均一性をフレーム原子吸光法で確認した．各濃度上中下 3 ポイントの平均値から求められた変動係数(C.V.(%)*)は 3 以内であり，基準値 10%に適合した．これにより硫化亜鉛投与液の均一性が確認された．

表示濃度 (mg/mL)	ポイント	分析値 (mg/mL)	変動係数 (C.V.(%)*)
4.0	上	3.8	2.6
	中	4.0	
	下	3.8	
100.0	上	102	1.0
	中	103	
	下	105	

＊変動係数（C.V.(%)）＝標準偏差／分析平均値×100

2.投与液の濃度確認

投与開始時に調製した硫化亜鉛投与液の濃度をフレーム原子吸光法で確認した．濃度分析値は表示濃度に対して±3%以内のずれであり，試験計画書の評価基準である表示濃度±10%に適合していることが確認された．

表示濃度 (mg/mL)	分析値 (mg/mL)	調製濃度比* (%)
4.0	3.88	97
20.0	20.6	103
100.0	101	101

＊調製濃度比（%）＝分析値／表示濃度×100

添付資料 2

1. 弊所で実施した投与期間終了時週齢の雌の血液学的検査　背景データ

背景データ － 度数分布表 － 血液学的検査　　期間　1995 -2001
動物種：SD ラット　　性：雌　　週齢：9 週齢

項目

好中球分葉核球比(%)	範囲	動物数	%	n	平均	標準偏差	最小	最大
	-1.5 - 0.5	8	1.09	732	5.7	3.2	0	19
	0.5 - 2.5	103	14.07					
	2.5 - 4.5	185	25.27					
	4.5 - 6.5	165	22.54					
	6.5 - 8.5	137	18.72					
	8.5 - 10.5	73	9.97					
	10.5 - 12.5	38	5.19					
	12.5 - 14.5	15	2.05					
	14.5 - 16.5	4	0.55					
	16.5 - 18.5	3	0.41					
	18.5 - 20.5	1	0.14					

添付資料 3

行動検査の方法および採点基準

(1)ハンドリング時観察

ホームケージ外

手に持って観察する.

①皮膚

外傷　　N異常なし，P有り(ある場合は部位を記録)

皮膚の色　N異常なし，１チアノーゼ，２蒼白，３蒼白(耳介)，４潮紅(耳介)，５潮紅

②被毛

被毛の汚れ　N異常なし，１軽度，２高度

被毛の状態　N異常なし，１軽度，２高度

（被毛の状態は，毛並み，被毛の光沢，被毛粗剛化をみる．）

③眼

眼球突出　　N異常なし，P有り

眼瞼の開き具合　　N異常なし，１ 50%以上開，２ 50%未満開，３眼瞼閉鎖

④粘膜

粘膜の色　N異常なし，１チアノーゼ，２蒼白

⑤分泌物

分泌物の付着　N異常なし，１軽度，２重度

⑥流涙　　N異常なし，１軽度，２中等度，３重度

⑦流涎　　N異常なし，１軽度，２中等度，３重度

⑧ハンドリングに対する反応

１低下（とても簡単，反応無し）

N正常（脚を引き上げるだけ，鳴くが抵抗しない，少々もがくなど通常の行動）

２亢進（大げさに逃げる，掴むとひどくもがく，鳴く）

３攻撃的，噛みつこうとする

⑨瞳孔径　　N異常なし，１縮瞳，２散瞳

(2)オープンフィールド内観察

１匹ずつオープンフィールドに動物を入れて，２分間観察する．次の動物を入れる前にオープンフィールドの床をマイクロカットで拭く．

①排泄物

下痢　　N異常なし，１軟便，２水様便

多尿　　N異常なし，P有り

②自律機能

姿勢　　N異常なし，１腹臥位，２側臥位，３うずくまり

立毛　　N異常なし，P有り

異常な呼吸様式

N異常なし，１不整，２浅速，３深大，４緩徐，５あえぎ

歩行　　N異常なし

１運動失調（過度の揺れ，よろめく，傾く）

２体を引きずる（胃の辺りが地面につく，多少揺れる）

３後肢が開く，引きずる，体は地面につく

４つま先立ち歩行

５丸背歩行

６歩行不能

痙攣

N異常なし

間代性　１顎，口の震え

２四肢の震え

３反復性の全身の痙攣

強直性　１強直，後肢筋肉のコンスタントな収縮あるいは伸展

２頭，体，四肢が硬直し弓反る

３前わん痙攣，頭，体，四肢が前方に伸展する

４ポップコーン痙攣，繰り返し飛び上がる

５窒息性，呼吸困難あるいは発作後抑制状態，死に至るようなもの

③常同行動　N異常なし

P有り（反復的旋回，常同的毛づくろい，歩調取り，反復的嗅ぎ行動，反復的な首振りなど詳細を記録)

④異常行動　N異常なし

P有り（自傷行動，挙尾，後方突進，身もだえ，がくっと倒れるなど詳細を記録)

(3)刺激に対する反応

①接近反応（オープンフィールド）

ラットの顔面から３cmに先の丸い棒を近づけ，４秒間保持する．

１反応無し

N正常―ゆっくり近づき臭いを嗅ぐまたは立ち去る

２亢進，過度の反応，急な動き

３攻撃，噛みつく

②聴覚反応（オープンフィールド）

ラットの頭上で指を鳴らす

１反応無し

N正常－しりごむ，あるいは耳をピクッと動かす

２異常な反応－ジャンプ，さっと動く，暴力的な行動

③空中正向反射（オープンフィールド）

ラットは背中を下向きにして３０cmの高さから落とす（２回実施）．

N正常

１少しバランスが悪い

２横向きに着地

３仰向けに着地

ほ乳類を用いる28日間反復投与毒性試験結果報告書

1. 一般的事項

新規化学物質の名称 (IUPAC命名法による)	硫化亜鉛				
別名	ZnS	物理化学的性状	分子量[3]		97.45
構造式又は示性式 (いずれも不明の場合は, その製法の概要)	ZnS Lot No. [redacted]		常温における性状[2]		微緑ー白色粉末，無臭
			安定性[2]		通常の使用においては安定である
			融点[2]		1180℃で昇華
			沸点[2]		昇華
			蒸気圧		-
			分配係数		-
			比重[2]		4.06
			溶解度	水[2]	0.688mg/100mL (18℃)
				DMSO	-
				アセトン	-
				その他[2]	希塩酸，希硫酸に可溶．水を含んだ状態では空気中で徐々に酸化されて硫酸亜鉛を生じる．
試験に供した 新規化学物質の純度	98.1%[1]				
不純物の名称及び濃度	-				
CAS番号	1314-98-3[2]				

1) [redacted]試験成績書による
2) [redacted]MSDSによる
3) : The Merck Index, eleventh edition (1989) による

DMSO:ジメチルスルホキシド

2. 急性毒性試験

試験No.	試験の種類および期間	動物種	1群当たりの動物数	投与経路	投与量 (mg/kg)	LD_{50}値又はNOEL* (mg/kg)	実験場所
1	7日間反復投与予備試験	ラット Crj:CD (SD) IGS	雌雄各3匹	強制経口	1000	異常なし (NOEL)	(株)三菱化学安全科学研究所 鹿島研究所
					500	異常なし	
					100	異常なし	
					0	異常なし 観察項目： 一般状態，体重，血液学的検査，器官重量(脳，胸腺，肝臓，腎臓，副腎，脾臓，精巣，卵巣)，剖検	

*NOEL, no-observed-effect level

3．28日間反復投与毒性試験

被験物質投与期間	自　2000年11月30日　至　2000年12月27日												
使用動物・系統	ラット・Crj:CD(SD)IGS				1群当たりの動物数　雄：6　雌：6								
投与経路	強制経口投与　（溶媒：0.5%CMC-Na水溶液）												
性	雄						雌						備　考
被験物質の純度：98.1% ／ 群	対照	低用量	中用量	高用量	回復		対照	低用量	中用量	高用量	回復		
用量（mg/kg）	0	40	200	1000	0	1000	0	40	200	1000	0	1000	
一般状態													
脱毛	1)												
顔面部	0	0	0	1	0	1	0	0	0	0	0	0	
前肢	2	0	1	0	1	0	0	1	0	1	0	1	
掻創													
顔面部	0	0	0	1	0	0	0	0	0	0	0	0	
背部	0	0	0	1	0	0	0	0	0	0	0	0	
痂皮形成													
顔面部	0	0	0	1	0	0	0	0	0	0	0	0	
頚部	0	1	0	2	0	0	0	0	0	0	0	0	
背部	0	2	1	1	0	1	0	0	0	0	0	0	
行動検査													
詳細な一般状態観察													
(Week 2)													
外傷（背部）	0	0	0	1	*	*	0	0	0	0	*	*	
（左鼻）	0	0	0	1	*	*	0	0	0	0	*	*	
(Week 3)													
外傷（背部）	0	1	0	1	*	*	0	0	0	0	*	*	
（背部，頚部）	0	1	0	0	*	*	0	0	0	0	*	*	
（左背部，左鼻）	0	0	0	1	*	*	0	0	0	0	*	*	
歩行（運動失調）	1	0	0	0	*	*	0	0	0	0	*	*	
(Week 4)													
外傷（背部）	0	1	1	1	*	*	0	0	0	0	*	*	
刺激に対する反応		−	−	−	*	*		−	−	−	*	*	
握力		−	−	−	*	*		−	−	−	*	*	
自発運動量		−	−	−	*	*		−	−	−	*	*	
体重		−	−	−		−		−	−	−		−	
摂餌量		−	−	−		−		−	−	−		−	
血液学的検査													
白血球百分率													
好中球分葉核球比		−	−	−		−		▽	−	▽		−	
血液生化学的検査													
ASAT(GOT)		−	−	−		−		−	−	−		▽	
ALP		−	−	−		▽		−	−	−		−	
尿検査		−	−	−		−		−	−	−		−	
器官重量（絶対重量）													
脾臓		−	−	−		−		−	−	−		▲	
器官重量（相対重量）													
胸腺		−	−	−		−		−	△	−		−	
脾臓		−	−	−		−		−	−	−		△	

1) 発現例数．ただし，投与期間の発症数には回復群動物の発症数も含む
−，有意差なし；　*，検査せず；　△▽，$p<0.05$；　▲▼，$p<0.01$．
ALP，アルカリフォスファターゼ

3．28日間反復投与毒性試験

被験物質投与期間	自　2000年11月30日　至　2000年12月27日												
使用動物・系統	ラット・Crj:CD(SD)IGS						1群当たりの動物数　雄：6　雌：6						
投与経路	強制経口投与　(溶媒：0.5%CMC-Na水溶液)												
性	雄						雌						備　考
被験物質の純度：98.1% ＼ 群	対照	低用量	中用量	高用量	回復		対照	低用量	中用量	高用量	回復		
用量 (mg/kg)	0	40	200	1000	0	1000	0	40	200	1000	0	1000	
剖検所見													
脾臓													
副脾	1	0	0	0	0	0	0	0	0	0	0	0	
瘢痕	0	0	1	0	0	0	0	0	0	0	0	0	
肝臓													
横隔膜面結節	0	0	0	0	0	0	0	1	0	0	0	0	
肺													
褐色斑	0	0	0	0	0	1	0	0	0	0	0	0	
腎臓													
嚢胞	0	0	2	0	1	0	0	0	0	0	0	0	
精巣													
小型	0	1	0	0	0	0							
精巣上体													
小型	0	1	0	0	0	0							
甲状腺													
結節	0	1	0	0	0	0	0	0	0	0	0	0	
皮膚													
痂皮	0	1	1	1	0	0	0	0	0	0	0	0	
脱毛	1	0	1	0	0	0	0	1	0	0	0	0	
組織学的所見													
心臓	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
下顎リンパ節	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
腸間膜リンパ節	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
胸腺	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
脾臓													
小肉芽腫　1+	1	*	1) 0/1	0	*	*	0	*	*	0	*	*	
大腿骨(骨髄)	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
気管	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
肺													
泡沫細胞集簇　1+	0	*	*	0	*	0/1	1	*	*	0	*	*	
限局性出血　1+	0	*	*	0	*	1/1	0	*	*	0	*	*	
胃													
腺胃の限局性炎症性細胞浸潤　1+	1	*	*	1	*	*	0	*	*	0	*	*	
十二指腸	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
空腸	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
回腸	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
盲腸	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
結腸	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
直腸	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
肝臓													
門脈域肝細胞脂肪化　1+	0	*	*	0	*	*	0	0/1	*	1	*	*	
限局性炎症性細胞浸潤　1+	4	*	*	4	*	*	3	1/1	*	4	*	*	
小肉芽腫　1+	1	*	*	2	*	*	1	1/1	*	1	*	*	
限局性肝細胞壊死　1+	2	*	*	1	*	*	0	0/1	*	0	*	*	

1+，軽度；1) 所見が認められた動物数/検査動物数
－，有意差なし；　*，検査せず；　△▽，$p<0.05$；　▲▼，$p<0.01$.
ND，異常は認められない.

3．28日間反復投与毒性試験

被験物質投与期間	自　2000年11月30日　至　2000年12月27日												
使用動物・系統	ラット・Crj:CD(SD)IGS				1群当たりの動物数　雄：6　雌：6								
投与経路	強制経口投与　(溶媒：0.5%CMC-Na水溶液)												
性	雄						雌						備考
被験物質の純度：98.1% ＼ 群	対照	低用量	中用量	高用量	回復		対照	低用量	中用量	高用量	回復		
用量 (mg/kg)	0	40	200	1000	0	1000	0	40	200	1000	0	1000	
組織学的所見													
腎臓													
好塩基性尿細管 1+	4	*	1) 0/2 ▲	2	0/1	*	1	*	*	1	*	*	
嚢胞 1+	0	*	2/2	0	1/1	*	0	*	*	0	*	*	
腎盂拡張 1+	0	*	0/2	0	1/1	*	0	*	*	0	*	*	
近位尿細管上皮の硝子滴 1+	3	*	2/2	3	1/1	*	0	*	*	0	*	*	
限局性炎症性細胞浸潤 1+	0	*	0/2	0	0/1	*	0	*	*	1	*	*	
間質の限局性リンパ球浸潤 1+	2	*	0/2	1	0/1	*	1	*	*	1	*	*	
膀胱	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
精巣													
び漫性精細管萎縮 1+	0	1/1	*	0	*	*							
間細胞のび漫性増生 1+	0	1/1	*	0	*	*							
精巣上体													
精子数の減少 3+	0	1/1	*	0	*	*							
限局性リンパ球浸潤 1+	4	0/1	*	4	*	*							
前立腺													
限局性炎症性細胞浸潤 1+	0	*	*	2	*	*							
2+	2	*	*	0	*	*							
卵巣													
卵胞嚢胞 1+							0	*	*	2	*	*	
黄体嚢胞 1+							1	*	*	0	*	*	
子宮													
腔拡張 1+							1	*	*	0	*	*	
膣													
粘膜増生 1+							1	*	*	0	*	*	
び漫性炎症性細胞浸潤 1+							0	*	*	1	*	*	
下垂体	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
甲状腺													
異所性胸腺組織 1+	2	1/1	*	1	*	*	0	*	*	2	*	*	
鰓後体遺残 1+	1	0/1	*	1	*	*	1	*	*	1	*	*	
上皮小体	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
副腎													
束状帯細胞の脂肪滴増加 1+	1	*	*	1	*	*	0	*	*	0	*	*	
脳	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
脊髄	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
坐骨神経	ND	*	*	ND	*	*	ND	*	*	ND	*	*	

1+，軽度；2+，中等度；3+，重度；1)所見が認められた動物数/検査動物数
*，検査せず；　△▽，$p<0.05$；　▲▼，$p<0.01$.
ND，異常は認められない.

3．28日間反復投与毒性試験

被験物質投与期間	自　2000年11月30日　至　2000年12月27日												
使用動物・系統	ラット・Crj:CD(SD)IGS						1群当たりの動物数　雄：6　雌：6						
投与経路	強制経口投与　(溶媒：0.5%CMC-Na水溶液)												
性	雄						雌						備考
被験物質の純度：98.1% ＼ 群	対照	低用量	中用量	高用量	回復		対照	低用量	中用量	高用量	回復		
用量 (mg/kg)	0	40	200	1000	0	1000	0	40	200	1000	0	1000	
組織学的所見													
皮膚	1)												
毛胞萎縮 1+	0/1	0/1	0/2	0/1	*	*	*	1/1	*	*	*	*	
痂皮 1+	0/1	0/1	2/2	0/1	*	*	*	0/1	*	*	*	*	
皮膚炎 1+	0/1	1/1	0/2	1/1	*	*	*	0/1	*	*	*	*	
皮下織													
限局性炎症性細胞浸潤 1+	1/1	1/1	2/2	1/1	*	*	*	*	*	*	*	*	
大腿骨	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
眼球	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
ハーダー腺	ND	*	*	ND	*	*	ND	*	*	ND	*	*	
NOEL (mg/kg)	雄，1000 mg/kg						雌，1000 mg/kg						
NOELの推定根拠とした変化	雌雄とも1000mg/kgで被験物質投与に起因すると思われる変化は認められなかった.												

1+，軽度；1)所見が認められた動物数/検査動物数
*，検査せず；ND，異常は認められない.

4．　その他

反復投与毒性試験実施機関	名　称	株式会社三菱化学安全科学研究所　鹿島研究所*1
	所在地	茨城県鹿島郡波崎町砂山14番地*2　　電話 (0479)-46-2871
試験責任者	[redacted]	
試験実施年月日		

*1，*2は投与液の均一性，濃度分析のみ以下の機関にて実施した.
株式会社三菱化学安全科学研究所　横浜研究所
神奈川県横浜市青葉区鴨志田町1000番地

図および群別表

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

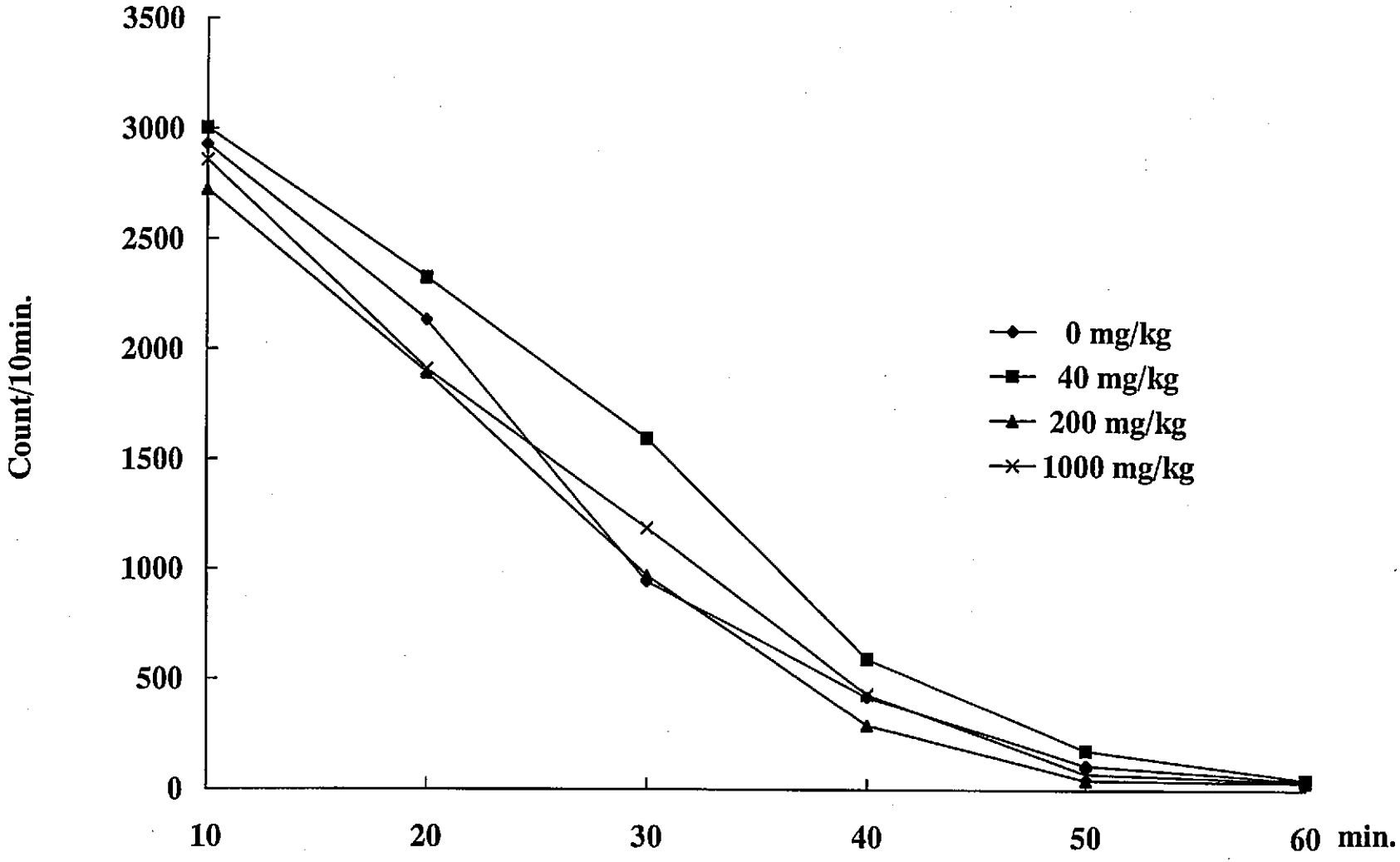

Figure 1 Functional Observations, Motor Activity(Male)

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

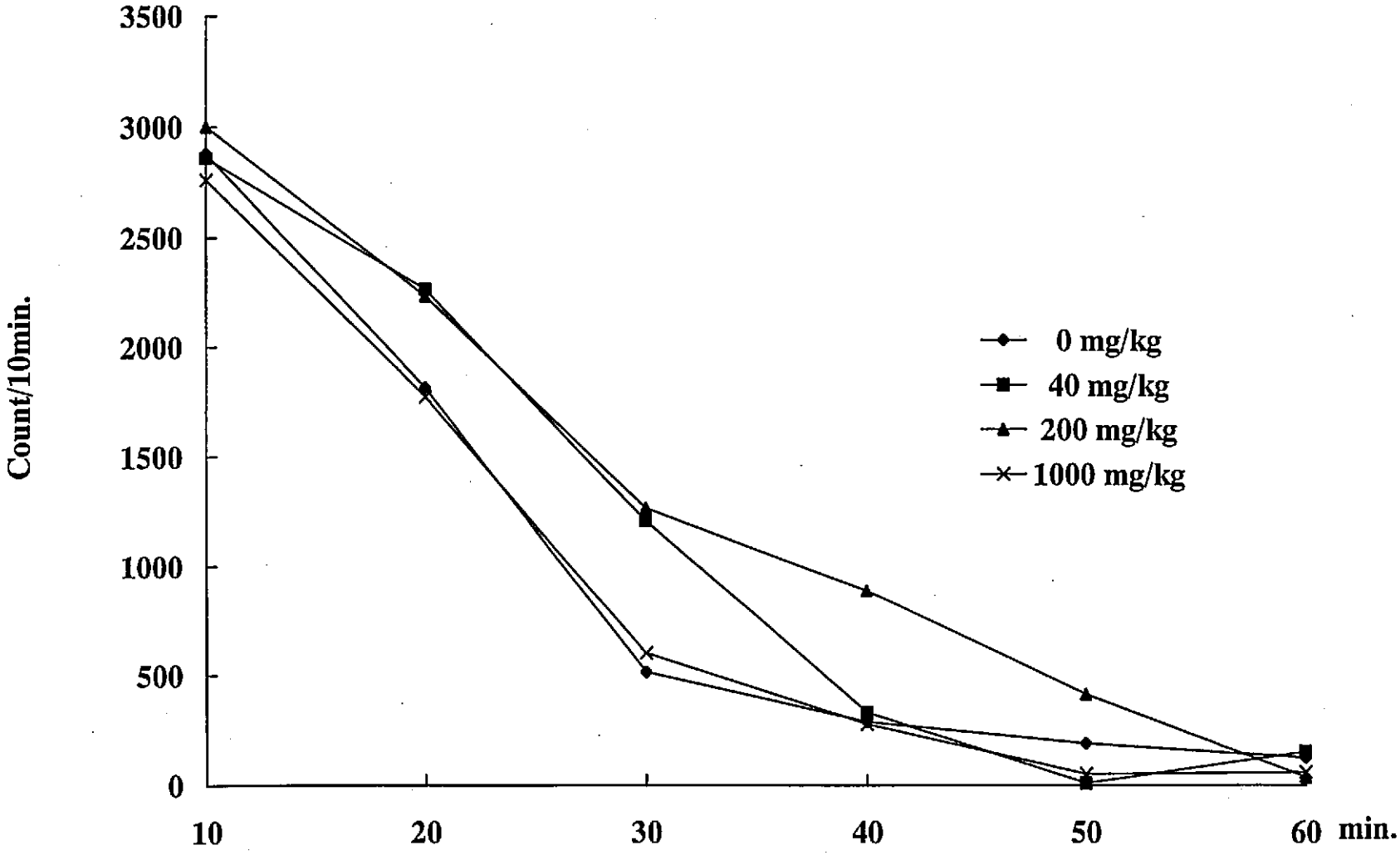

Figure 1 Functional Observations, Motor Activity(Female)

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

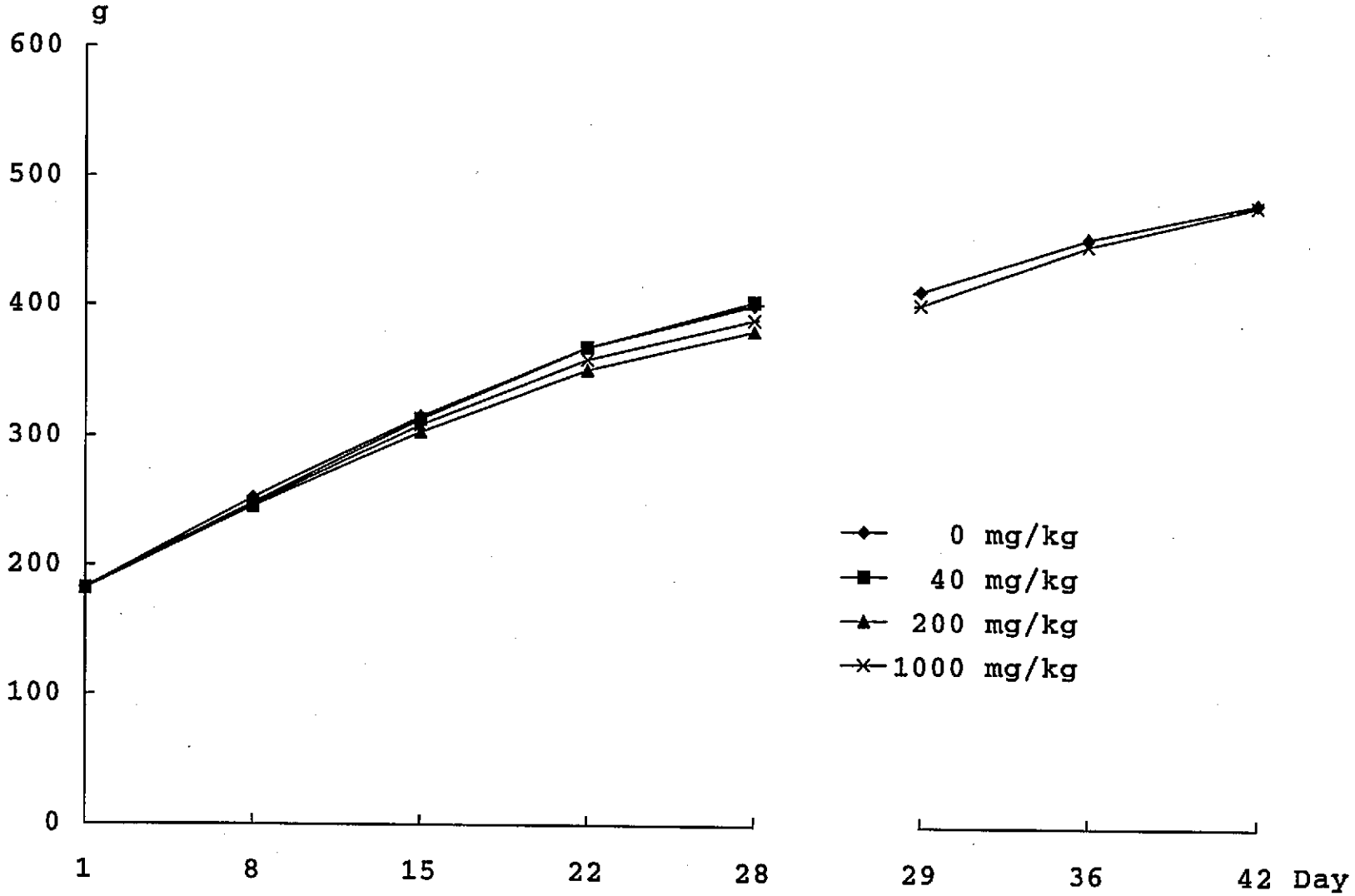

Figure 2 Body Weight((Male)

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

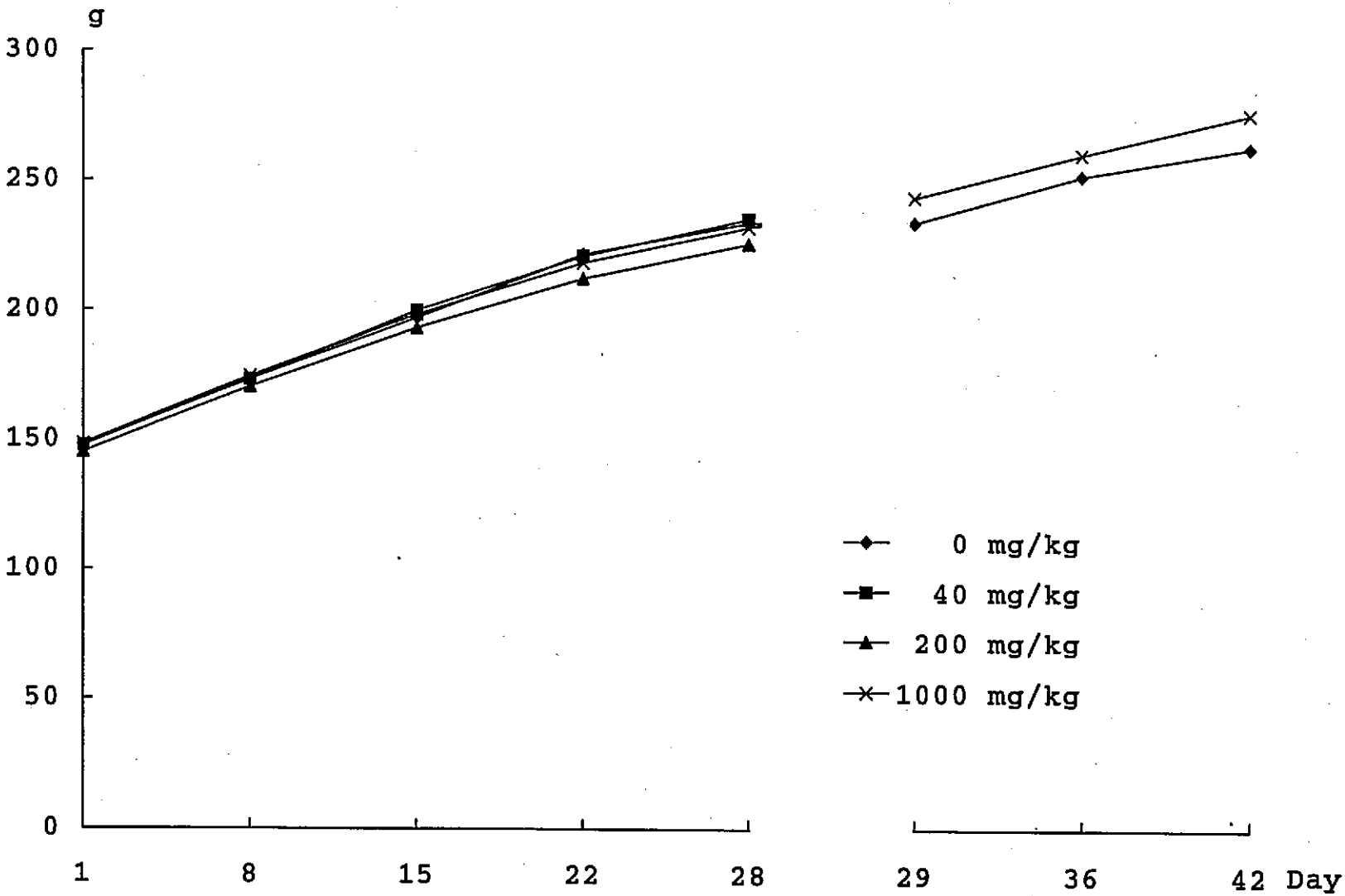

Figure 2 Body Weight(Female)

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Table 1 Clinical Sign - Summary

Male

Study No. B000875

Test Substance Dose(mg/kg)	Findings		Day	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	
			Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
ZnS		Number of Animals		12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	0	No Abnormality		12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11	11	12	12	12	12
		Loss of fur	11	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0
ZnS		Number of Animals		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	40	No Abnormality		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5
		Crust formation	06	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
			09	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
ZnS		Number of Animals		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	200	No Abnormality		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
		Loss of fur	11	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Crust formation	09	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ZnS		Number of Animals		12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	1000	No Abnormality		12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	10	10	10	10	10	10	10	10
		Loss of fur	03	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Scratched wound	03	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
			09	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		Crust formation	03	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	1	1
			06	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
			09	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;
11 , Forelimb; 03 , Face; 06 , Neck; 09 , Back;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 1 Clinical Sign -Summary

Male

Test Substance Dose(mg/kg)	Findings		Day Time	18 10	18 20	19 10	19 20	20 10	20 20	21 10	21 20	22 10	22 20	23 10	23 20	24 10	24 20	25 10	25 20	26 10	26 20	27 10	27 20	28 10	28 20	29	30	31	32	33	34	35	36	37	38	39	40
ZnS	Number of Animals			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	6	6	6	6	6	6	6	6	6	6
0	No Abnormality			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	10	5	5	5	5	5	5	5	5	5	5
	Loss of fur	11	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	1	1	1	1	1	1	1
ZnS	Number of Animals			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6										
40	No Abnormality			5	5	5	5	5	5	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5										
	Crust formation	06	+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1										
		09	+	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1										
ZnS	Number of Animals			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6										
200	No Abnormality			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	4										
	Loss of fur	11	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1										
	Crust formation	09	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1										
ZnS	Number of Animals			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	6	6	6	6	6	6	6	6	6	6
1000	No Abnormality			10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	6	6	6	6	6	6	6	6	6	6
	Loss of fur	03	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	Scratched wound	03	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		09	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Crust formation	03	+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		06	+	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		09	+	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;
11 , Forelimb; 03 , Face; 06 , Neck; 09 , Back;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 1 Clinical Sign - Summary Male

Study No. B000875

Test Substance Dose(mg/kg)	Findings	Day Time		41	42	43
ZnS	Number of Animals			6	6	6
0	No Abnormality			5	6	6
	Loss of fur	11	+	1	0	0
ZnS	Number of Animals					
40	No Abnormality					
	Crust formation	06	+			
		09	+			
ZnS	Number of Animals					
200	No Abnormality					
	Loss of fur	11	+			
	Crust formation	09	+			
ZnS	Number of Animals			6	6	6
1000	No Abnormality			6	6	6
	Loss of fur	03	+	0	0	0
	Scratched wound	03	+	0	0	0
		09	+	0	0	0
	Crust formation	03	+	0	0	0
		06	+	0	0	0
		09	+	0	0	0

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;

11 , Forelimb; 03 , Face; 06 , Neck; 09 , Back;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Table 1 Clinical Sign - Summary

Female

Study No. B000875

Test Substance Dose(mg/kg)	Findings			Day	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	
				Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
ZnS		Number of Animals			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	0	No Abnormality			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
ZnS		Number of Animals			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	40	No Abnormality			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
		Loss of fur	11	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ZnS		Number of Animals			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	200	No Abnormality			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS		Number of Animals			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	1000	No Abnormality			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
		Loss of fur	11	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Test Substance Dose(mg/kg)	Findings			Day	18		19		20		21		22		23		24		25		26		27		28		29	30	31	32	33	34	35	36	37	38	39	40
				Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20												
ZnS		Number of Animals			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	6	6	6	6	6	6	6	6	6	6	6
	0	No Abnormality			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	6	6	6	6	6	6	6	6	6	6	6
ZnS		Number of Animals			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6											
	40	No Abnormality			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5											
		Loss of fur	11	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1											
ZnS		Number of Animals			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6											
	200	No Abnormality			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6											
ZnS		Number of Animals			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	6	6	6	6	6	6	6	6	6	6	6
	1000	No Abnormality			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	5	5	5	5	5	5	5	5	5	5	5
		Loss of fur	11	+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;
11 , Forelimb;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 1 Clinical Sign - Summary Female

Study No. B000875

Test Substance Dose(mg/kg)	Findings	Day Time		41	42	43
ZnS 0	Number of Animals			6	6	6
	No Abnormality			6	6	6
ZnS 40	Number of Animals					
	No Abnormality					
	Loss of fur	11	+			
ZnS 200	Number of Animals					
	No Abnormality					
ZnS 1000	Number of Animals			6	6	6
	No Abnormality			5	6	6
	Loss of fur	11	+	1	0	0

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;

11 , Forelimb;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 0)

Study No. B000875

Item / Findings	Sex / Test Substance / Dose (mg/kg) / Number of Animals	Male				Female			
		ZnS 0 12	ZnS 40 6	ZnS 200 6	ZnS 1000 12	ZnS 0 12	ZnS 40 6	ZnS 200 6	ZnS 1000 12
On removal from home cage									
Trauma									
None		12	6	6	12	12	6	6	12
Color of skin									
Normal		12	6	6	12	12	6	6	12
Soiled fur									
None		12	6	6	12	12	6	6	12
Condition of fur									
Normal		12	6	6	12	12	6	6	12
Exophthalmos									
None		12	6	6	12	12	6	6	12
Palpebral closure									
None		12	6	6	12	12	6	6	12
Color of mucosa									
Normal		12	6	6	12	12	6	6	12
Occurrence of secretion									
None		12	6	6	12	12	6	6	12
Lacrimation									
None		12	6	6	12	12	6	6	12
Salivation									
None		12	6	6	12	12	6	6	12
Reactivity on handling									
Normal		12	6	6	12	12	6	6	12
Pupil size									
Normal		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 0)

Study No. B000875

Item / Findings	Sex	Male				Female			
	Test Substance	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	0	40	200	1000	0	40	200	1000
	Number of Animals	12	6	6	12	12	6	6	12
Open field									
Diarrhea									
None		12	6	6	12	12	6	6	12
Polyuria									
None		12	6	6	12	12	6	6	12
Posture									
Normal		12	6	6	12	12	6	6	12
Piloerection									
None		12	6	6	12	12	6	6	12
Breathing									
Normal		12	6	6	12	12	6	6	12
Gait									
Normal		12	6	6	12	12	6	6	12
Convulsion									
None		12	6	6	12	12	6	6	12
Stereotypy									
None		12	6	6	12	12	6	6	12
Bizarre behaviour									
None		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 1)

Study No. B000875

Item / Findings	Sex / Test Substance / Dose (mg/kg) / Number of Animals	Male ZnS 0 / 12	Male ZnS 40 / 6	Male ZnS 200 / 6	Male ZnS 1000 / 12	Female ZnS 0 / 12	Female ZnS 40 / 6	Female ZnS 200 / 6	Female ZnS 1000 / 12
On removal from home cage									
Trauma									
None		12	6	6	12	12	6	6	12
Color of skin									
Normal		12	6	6	12	12	6	6	12
Soiled fur									
None		12	6	6	12	12	6	6	12
Condition of fur									
Normal		12	6	6	12	12	6	6	12
Exophthalmos									
None		12	6	6	12	12	6	6	12
Palpebral closure									
None		12	6	6	12	12	6	6	12
Color of mucosa									
Normal		12	6	6	12	12	6	6	12
Occurrence of secretion									
None		12	6	6	12	12	6	6	12
Lacrimation									
None		12	6	6	12	12	6	6	12
Salivation									
None		12	6	6	12	12	6	6	12
Reactivity on handling									
Normal		12	6	6	12	12	6	6	12
Pupil size									
Normal		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 1)

Study No. B000875

Item / Findings	Sex	Test Substance	Dose (mg/kg)	Number of Animals	Male				Female			
					ZnS 0	ZnS 40	ZnS 200	ZnS 1000	ZnS 0	ZnS 40	ZnS 200	ZnS 1000
					12	6	6	12	12	6	6	12
Open field												
Diarrhea												
None					12	6	6	12	12	6	6	12
Polyuria												
None					12	6	6	12	12	6	6	12
Posture												
Normal					12	6	6	12	12	6	6	12
Piloerection												
None					12	6	6	12	12	6	6	12
Breathing												
Normal					12	6	6	12	12	6	6	12
Gait												
Normal					12	6	6	12	12	6	6	12
Convulsion												
None					12	6	6	12	12	6	6	12
Stereotypy												
None					12	6	6	12	12	6	6	12
Bizarre behaviour												
None					12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 2)

Study No. B000875

Item / Findings	Sex	Male				Female			
	Test Substance	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	0	40	200	1000	0	40	200	1000
	Number of Animals	12	6	6	12	12	6	6	12
On removal from home cage									
Trauma									
None		12	6	6	10	12	6	6	12
Positive (back)		0	0	0	1	0	0	0	0
(left nose)		0	0	0	1	0	0	0	0
Color of skin									
Normal		12	6	6	12	12	6	6	12
Soiled fur									
None		12	6	6	12	12	6	6	12
Condition of fur									
Normal		12	6	6	12	12	6	6	12
Exophthalmos									
None		12	6	6	12	12	6	6	12
Palpebral closure									
None		12	6	6	12	12	6	6	12
Color of mucosa									
Normal		12	6	6	12	12	6	6	12
Occurrence of secretion									
None		12	6	6	12	12	6	6	12
Lacrimation									
None		12	6	6	12	12	6	6	12
Salivation									
None		12	6	6	12	12	6	6	12
Reactivity on handling									
Normal		12	6	6	12	12	6	6	12
Pupil size									
Normal		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 2)

Study No. B000875

Item / Findings	Sex / Test Substance / Dose (mg/kg) / Number of Animals	Male				Female			
		ZnS 0 12	ZnS 40 6	ZnS 200 6	ZnS 1000 12	ZnS 0 12	ZnS 40 6	ZnS 200 6	ZnS 1000 12
Open field									
Diarrhea									
None		12	6	6	12	12	6	6	12
Polyuria									
None		12	6	6	12	12	6	6	12
Posture									
Normal		12	6	6	12	12	6	6	12
Piloerection									
None		12	6	6	12	12	6	6	12
Breathing									
Normal		12	6	6	12	12	6	6	12
Gait									
Normal		12	6	6	12	12	6	6	12
Convulsion									
None		12	6	6	12	12	6	6	12
Stereotypy									
None		12	6	6	12	12	6	6	12
Bizarre behaviour									
None		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 3)

Study No. B000875

Item / Findings	Sex / Test Substance / Dose (mg/kg) / Number of Animals	Male ZnS 0 / 12	Male ZnS 40 / 6	Male ZnS 200 / 6	Male ZnS 1000 / 12	Female ZnS 0 / 12	Female ZnS 40 / 6	Female ZnS 200 / 6	Female ZnS 1000 / 12
On removal from home cage									
Trauma									
None		12	4	6	10	12	6	6	12
Positive(back)		0	1	0	1	0	0	0	0
(back, neck)		0	1	0	0	0	0	0	0
(left back, left nose)		0	0	0	1	0	0	0	0
Color of skin									
Normal		12	6	6	12	12	6	6	12
Soiled fur									
None		12	6	6	12	12	6	6	12
Condition of fur									
Normal		12	6	6	12	12	6	6	12
Exophthalmos									
None		12	6	6	12	12	6	6	12
Palpebral closure									
None		12	6	6	12	12	6	6	12
Color of mucosa									
Normal		12	6	6	12	12	6	6	12
Occurrence of secretion									
None		12	6	6	12	12	6	6	12
Lacrimation									
None		12	6	6	12	12	6	6	12
Salivation									
None		12	6	6	12	12	6	6	12
Reactivity on handling									
Normal		12	6	6	12	12	6	6	12
Pupil size									
Normal		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 3)

Study No. B000875

Item / Findings	Sex	Male				Female			
	Test Substance	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	0	40	200	1000	0	40	200	1000
	Number of Animals	12	6	6	12	12	6	6	12
Open field									
Diarrhea									
None		12	6	6	12	12	6	6	12
Polyuria									
None		12	6	6	12	12	6	6	12
Posture									
Normal		12	6	6	12	12	6	6	12
Piloerection									
None		12	6	6	12	12	6	6	12
Breathing									
Normal		12	6	6	12	12	6	6	12
Gait									
Normal		11	6	6	12	12	6	6	12
Ataxia		1	0	6	0	0	0	0	0
Convulsion									
None		12	6	6	12	12	6	6	12
Stereotypy									
None		12	6	6	12	12	6	6	12
Bizarre behaviour									
None		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 4)

Study No. B000875

Item / Findings	Sex	Male				Female			
	Test Substance	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	0	40	200	1000	0	40	200	1000
	Number of Animals	12	6	6	12	12	6	6	12
On removal from home cage									
Trauma									
None		12	5	5	11	12	6	6	12
Positive(back)		0	1	1	1	0	0	0	0
Color of skin									
Normal		12	6	6	12	12	6	6	12
Soiled fur									
None		12	6	6	12	12	6	6	12
Condition of fur									
Normal		12	6	6	12	12	6	6	12
Exophthalmos									
None		12	6	6	12	12	6	6	12
Palpebral closure									
None		12	6	6	12	12	6	6	12
Color of mucosa									
Normal		12	6	6	12	12	6	6	12
Occurrence of secretion									
None		12	6	6	12	12	6	6	12
Lacrimation									
None		12	6	6	12	12	6	6	12
Salivation									
None		12	6	6	12	12	6	6	12
Reactivity on handling									
Normal		12	6	6	12	12	6	6	12
Pupil size									
Normal		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 2 Functional Observations, Detailed Clinical Observations - Summary (Week 4)

Study No. B000875

Item / Findings	Sex	Male				Female			
	Test Substance	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	0	40	200	1000	0	40	200	1000
	Number of Animals	12	6	6	12	12	6	6	12
Open field									
Diarrhea									
None		12	6	6	12	12	6	6	12
Polyuria									
None		12	6	6	12	12	6	6	12
Posture									
Normal		12	6	6	12	12	6	6	12
Piloerection									
None		12	6	6	12	12	6	6	12
Breathing									
Normal		12	6	6	12	12	6	6	12
Gait									
Normal		12	6	6	12	12	6	6	12
Convulsion									
None		12	6	6	12	12	6	6	12
Stereotypy									
None		12	6	6	12	12	6	6	12
Bizarre behaviour									
None		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875

Table 3　　Functional Observations, Sensory Reactivity to Stimuli - Summary (Week 4)

Item / Findings	Sex	Male				Female			
	Test Substance	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	0	40	200	1000	0	40	200	1000
	Number of Animals	12	6	6	12	12	6	6	12
Approach response									
Normal		12	6	6	12	12	6	6	12
Finger snap response									
Normal		12	6	6	12	12	6	6	12
Righting reflex, drop method(first)									
Normal		12	6	6	12	12	6	6	12
Righting reflex, drop method(second)									
Normal		12	6	6	12	12	6	6	12

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Table 4 Functional Observations, Grip Strength - Summary (Week 4) Male

Test Substance Dose(mg/kg)		Forelimb Average	Hindlimb Average
ZnS 0	Mean	878.33	548.13
	S.D.	142.03	105.25
	n	12	12
ZnS 40	Mean	837.25	575.50
	S.D.	123.72	54.67
	n	6	6
ZnS 200	Mean	828.50	565.58
	S.D.	56.41	89.81
	n	6	6
ZnS 1000	Mean	790.25	529.08
	S.D.	142.92	69.55
	n	12	12

Significantly different from control : *, P<0.05; **, P<0.01.

Table 4 Functional Observations, Grip Strength - Summary (Week 4) Female

Test Substance Dose(mg/kg)		Forelimb Average	Hindlimb Average
ZnS 0	Mean	659.92	452.63
	S.D.	144.95	124.16
	n	12	12
ZnS 40	Mean	586.83	437.83
	S.D.	120.41	55.70
	n	6	6
ZnS 200	Mean	668.17	437.42
	S.D.	120.43	109.30
	n	6	6
ZnS 1000	Mean	665.33	457.79
	S.D.	127.77	111.16
	n	12	12

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875

Table 5　　Functional Observations, Motor Activity - Summary (Week 4)　　Male

Test Substance Dose(mg/kg)		Time: 10 Unit: count/ 10min	20 count/ 10min	30 count/ 10min	40 count/ 10min	50 count/ 10min	60 count/ 10min	Total count/ hour
ZnS	Mean	2929.7	2132.8	944.3	418.4	109.8	43.2	6578.0
0	S.D.	354.6	621.0	845.9	575.8	192.3	35.4	1996.3
	n	12	12	12	12	12	12	12
ZnS	Mean	3004.3	2325.2	1595.7	591.3	177.2	46.5	7740.2
40	S.D.	163.8	333.6	354.6	834.1	396.2	33.6	1869.6
	n	6	6	6	6	6	6	6
ZnS	Mean	2724.7	1892.3	970.3	291.0	44.2	35.5	5958.0
200	S.D.	255.4	781.1	988.7	369.4	43.5	34.3	2225.8
	n	6	6	6	6	6	6	6
ZnS	Mean	2860.3	1908.3	1187.1	429.9	71.8	41.0	6498.4
1000	S.D.	217.5	442.4	738.5	547.9	122.3	46.3	1691.1
	n	12	12	12	12	12	12	12

Significantly different from control　　: *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 5 Functional Observations, Motor Activity - Summary (Week 4) Female

Test Substance Dose(mg/kg)		Time: 10 Unit: count/ 10min	20 count/ 10min	30 count/ 10min	40 count/ 10min	50 count/ 10min	60 count/ 10min	Total count/ hour
ZnS 0	Mean	2880.7	1815.3	514.3	287.8	190.1	125.3	5813.4
	S.D.	357.8	518.3	659.7	563.2	570.3	288.9	2191.6
	n	12	12	12	12	12	12	12
ZnS 40	Mean	2859.0	2261.8	1207.0	331.0	8.2	151.5	6818.5
	S.D.	274.5	632.8	833.0	432.2	7.3	308.0	2005.5
	n	6	6	6	6	6	6	6
ZnS 200	Mean	3001.0	2231.8	1265.2	886.5	412.2	36.2	7832.8
	S.D.	374.4	389.0	949.1	1042.5	566.2	27.1	2849.5
	n	6	6	6	6	6	6	6
ZnS 1000	Mean	2760.8	1773.4	600.6	277.5	50.3	59.0	5521.5
	S.D.	313.8	379.3	617.0	496.1	66.1	108.0	1502.8
	n	12	12	12	12	12	12	12

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 6 Body Weight - Summary Male Unit : g

Test Substance Dose(mg/kg)	Day	1	8	15	22	28	29	36	42
ZnS 0	Mean	182.8	252.3	315.2	367.8	400.6	412.0	453.5	480.2
	S.D.	7.4	12.4	19.5	29.2	35.7	40.5	51.7	57.8
	n	12	12	12	12	12	6	6	6
ZnS 40	Mean	182.7	248.3	313.0	367.8	403.2			
	S.D.	8.6	15.8	18.1	18.6	19.6			
	n	6	6	6	6	6			
ZnS 200	Mean	182.3	245.5	303.3	350.8	380.7			
	S.D.	11.8	16.5	20.5	23.5	30.0			
	n	6	6	6	6	6			
ZnS 1000	Mean	182.3	246.8	308.7	358.6	389.3	401.5	447.8	478.3
	S.D.	5.8	7.4	10.4	13.6	18.1	4.5	5.6	10.8
	n	12	12	12	12	12	6	6	6

Significantly different from control : *, $P<0.05$; **, $P<0.01$.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Table 6 Body Weight - Summary Female

Study No. B000875
Unit : g

Test Substance Dose(mg/kg)	Day	1	8	15	22	28	29	36	42
ZnS 0	Mean	148.1	173.3	196.8	221.3	233.3	233.3	251.3	262.0
	S.D.	6.3	10.0	10.8	14.4	16.9	19.4	20.6	20.6
	n	12	12	12	12	12	6	6	6
ZnS 40	Mean	147.7	173.2	199.7	220.5	234.8			
	S.D.	8.5	7.5	9.8	13.6	14.5			
	n	6	6	6	6	6			
ZnS 200	Mean	145.2	170.3	193.0	212.0	225.2			
	S.D.	6.4	12.2	12.2	19.7	22.3			
	n	6	6	6	6	6			
ZnS 1000	Mean	148.3	174.4	198.2	218.0	231.5	243.0	259.5	275.0
	S.D.	4.7	6.5	11.4	11.8	13.9	9.3	9.0	12.2
	n	12	12	12	12	12	6	6	6

Significantly different from control : *, $P<0.05$; **, $P<0.01$.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Table 7 Food Consumption - Summary Male

Study No. B000875

Unit : g/animal/day

Test Substance Dose(mg/kg)	Day	8	15	22	28	36	42
ZnS 0	Mean	25.28	27.78	29.01	29.19	30.15	30.12
	S.D.	1.23	1.86	2.84	2.69	3.54	4.25
	n	12	12	12	12	6	6
ZnS 40	Mean	24.33	27.28	28.40	29.25		
	S.D.	2.04	1.90	1.62	1.82		
	n	6	6	6	6		
ZnS 200	Mean	24.35	26.55	27.13	27.52		
	S.D.	1.92	1.53	1.55	2.11		
	n	6	6	6	6		
ZnS 1000	Mean	24.13	26.84	27.60	27.77	29.43	29.88
	S.D.	1.03	1.30	1.48	2.00	1.28	1.62
	n	12	12	12	12	6	6

Significantly different from control : *, $P<0.05$; **, $P<0.01$.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Table 7 Food Consumption - Summary Female

Study No. B000875

Unit : g/animal/day

Test Substance Dose(mg/kg)	Day	8	15	22	28	36	42
ZnS 0	Mean	16.67	17.28	17.68	18.43	18.93	18.42
	S.D.	1.32	1.43	1.72	1.84	1.97	1.36
	n	12	12	12	12	6	6
ZnS 40	Mean	16.80	17.72	18.15	18.05		
	S.D.	1.08	1.41	1.82	1.52		
	n	6	6	6	6		
ZnS 200	Mean	16.48	17.12	17.45	18.15		
	S.D.	1.31	1.56	2.02	2.26		
	n	6	6	6	6		
ZnS 1000	Mean	16.62	17.11	17.59	17.94	20.15	19.23
	S.D.	1.28	1.39	1.33	1.54	0.83	1.18
	n	12	12	12	12	6	6

Significantly different from control : *, $P<0.05$; **, $P<0.01$.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 8 Hematology - Summary Male

Test Substance	Dose(mg/kg)		RBC		Hb		Ht		MCV		MCH		MCHC		Reticulocyte Ratio		PLT		PT	
			x10⁴ /μl		g/dl		%		fl		pg		%		‰		x10⁴ /μl		sec	
			Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS	0	Mean	752.0	832.5	15.77	16.13	44.18	47.20	58.78	56.73	20.98	19.40	35.73	34.18	27.93	23.85	100.32	91.35	15.43	16.00
		S.D.	26.2	38.0	0.39	0.51	1.83	1.93	2.42	1.18	0.53	0.46	1.08	0.59	3.61	2.29	9.15	12.11	0.77	0.52
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS	40	Mean	775.3		16.08		45.15		58.23		20.77		35.62		28.92		98.93		14.90	
		S.D.	31.4		0.47		1.90		1.49		0.60		0.69		3.73		11.25		0.50	
		n	6		6		6		6		6		6		6		6		6	
ZnS	200	Mean	765.3		16.18		45.60		59.65		21.18		35.48		27.37		91.85		15.15	
		S.D.	30.5		0.51		1.47		3.01		1.14		0.75		3.39		10.52		0.29	
		n	6		6		6		6		6		6		6		6		6	
ZnS	1000	Mean	753.2	813.3	15.75	15.70	43.85	45.83	58.25	56.40	20.93	19.30	35.92	34.27	26.45	23.23	92.58	95.38	15.15	15.97
		S.D.	34.5	27.0	0.51	0.33	1.56	0.96	2.02	1.81	0.68	0.55	0.66	0.55	2.47	3.15	9.60	13.25	0.29	0.74
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Table 8 Hematology - Summary — Male

Test Substance	Dose(mg/kg)		APTT sec Week 5	APTT sec Week 7
ZnS	0	Mean	16.48	15.67
		S.D.	0.75	1.18
		n	6	6
ZnS	40	Mean	16.23	
		S.D.	1.16	
		n	6	
ZnS	200	Mean	15.83	
		S.D.	0.79	
		n	6	
ZnS	1000	Mean	16.45	16.00
		S.D.	1.73	0.49
		n	6	6

Significantly different from control : ＊, $P<0.05$; ＊＊, $P<0.01$.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 8 Hematology - Summary Male

Test Substance Dose(mg/kg)		WBC x10² /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
		Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS 0	Mean	101.33	109.27	93.7	89.7	2.7	6.3	0.0	0.0	0.8	1.5	0.0	0.0	2.8	2.5
	S.D.	21.91	24.28	3.0	3.3	0.8	2.5	0.0	0.0	1.2	1.4	0.0	0.0	1.8	1.6
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS 40	Mean	103.38		91.0		6.0		0.0		0.2		0.0		2.8	
	S.D.	21.04		6.6		5.6		0.0		0.4		0.0		1.2	
	n	6		6		6		6		6		6		6	
ZnS 200	Mean	113.72		90.2		5.8		0.0		0.7		0.0		3.3	
	S.D.	21.12		4.6		3.2		0.0		1.0		0.0		2.7	
	n	6		6		6		6		6		6		6	
ZnS 1000	Mean	108.60	99.52	90.0	89.0	5.8	8.0	0.0	0.0	0.5	0.5	0.0	0.0	3.7	2.5
	S.D.	24.84	19.36	3.9	5.3	3.0	4.1	0.0	0.0	0.5	0.8	0.0	0.0	1.9	1.6
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 8 Hematology - Summary Female

Test Substance Dose(mg/kg)		RBC x10⁴ /μl		Hb g/dl		Ht %		MCV fl		MCH pg		MCHC %		Reticulocyte Ratio ‰		PLT x10⁴ /μl		PT sec	
		Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS 0	Mean	732.2	824.2	15.23	15.90	41.65	45.63	56.88	55.40	20.80	19.28	36.57	34.85	21.55	22.70	90.05	85.75	13.93	16.85
	S.D.	31.6	45.0	0.62	0.65	1.72	2.17	0.76	0.61	0.59	0.38	0.77	0.63	2.34	3.79	13.56	8.25	2.34	0.78
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS 40	Mean	772.8		15.83		43.80		56.70		20.50		36.17		21.27		93.52		14.85	
	S.D.	35.7		0.71		1.77		1.26		0.28		0.49		2.88		11.91		2.06	
	n	6		6		6		6		6		6		6		6		6	
ZnS 200	Mean	761.8		15.83		43.20		56.75		20.78		36.62		21.27		91.07		14.45	
	S.D.	58.0		1.33		3.13		1.09		0.49		0.59		6.58		9.67		2.21	
	n	6		6		6		6		6		6		6		6		6	
ZnS 1000	Mean	715.2	789.2	14.63	15.28	40.27	43.83	56.28	55.55	20.45	19.37	36.32	34.88	22.30	19.82	90.42	93.97	13.60	16.78
	S.D.	62.6	21.3	1.58	0.26	4.04	0.89	2.37	1.06	0.97	0.40	0.39	0.57	4.54	5.65	8.38	16.85	2.21	0.53
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Table 8 Hematology - Summary — Female

Test Substance	Dose(mg/kg)		APTT sec Week 5	APTT sec Week 7
ZnS	0	Mean	15.00	13.92
		S.D.	0.68	1.36
		n	6	6
ZnS	40	Mean	13.20	
		S.D.	1.30	
		n	6	
ZnS	200	Mean	13.30	
		S.D.	1.18	
		n	6	
ZnS	1000	Mean	14.10	13.90
		S.D.	1.36	1.39
		n	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 8 Hematology - Summary Female

Test Substance Dose(mg/kg)		WBC x10² /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
		Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS 0	Mean	65.65	81.90	86.0	92.0	8.5	5.5	0.0	0.0	1.3	0.7	0.0	0.0	4.2	1.8
	S.D.	19.10	28.30	4.1	2.6	2.3	2.2	0.0	0.0	1.2	0.5	0.0	0.0	1.5	1.3
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS 40	Mean	82.92		92.5		3.5*		0.2		0.7		0.0		3.2	
	S.D.	13.38		2.7		2.8		0.4		0.5		0.0		1.5	
	n	6		6		6		6		6		6		6	
ZnS 200	Mean	84.22		90.3		4.8		0.0		0.5		0.0		4.3	
	S.D.	36.13		2.7		1.6		0.0		0.5		0.0		1.8	
	n	6		6		6		6		6		6		6	
ZnS 1000	Mean	80.87	79.63	89.0	92.0	4.7*	6.5	0.2	0.0	0.3	0.5	0.0	0.0	5.8	1.0
	S.D.	18.92	34.69	8.2	2.8	7.6	2.0	0.4	0.0	0.5	0.8	0.0	0.0	2.6	1.1
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, $P<0.05$; **, $P<0.01$.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Table 9 Blood Chemistry - Summary — Male

Test Substance Dose(mg/kg)		ASAT(GOT) U/l		ALAT(GPT) U/l		γGT U/l		ALP U/l		Total Bilirubin mg/dl		Urea Nitrogen mg/dl		Creatinine mg/dl		Glucose mg/dl		Total Cholesterol mg/dl	
		Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS	Mean	70.7	77.3	23.0	24.2	0.7	0.7	557.8	539.7	0.00	0.00	14.05	17.98	0.43	0.47	129.7	136.2	52.0	55.5
0	S.D.	8.5	12.8	3.0	3.1	0.5	0.5	107.4	133.6	0.00	0.00	1.87	1.72	0.05	0.05	13.6	7.9	9.7	4.6
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS	Mean	72.7		23.7		0.8		595.5		0.00		14.60		0.42		127.8		60.5	
40	S.D.	9.5		3.6		0.4		92.6		0.00		1.84		0.04		12.7		14.0	
	n	6		6		6		6		6		6		6		6		6	
ZnS	Mean	74.2		25.8		1.0		614.3		0.00		14.78		0.42		136.5		51.0	
200	S.D.	10.4		4.1		0.6		100.6		0.00		1.54		0.04		11.5		12.0	
	n	6		6		6		6		6		6		6		6		6	
ZnS	Mean	64.7	72.3	21.2	21.8	1.8	1.0	589.0	372.0*	0.00	0.00	15.08	16.30	0.47	0.50	133.2	138.5	60.8	56.3
1000	S.D.	9.2	7.6	6.0	3.1	1.2	0.6	117.6	31.4	0.00	0.00	3.42	2.15	0.14	0.00	8.6	14.1	12.4	8.2
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 9 Blood Chemistry - Summary Male

Test Substance	Dose(mg/kg)		Triglyceride mg/dl		Total Protein g/dl		Albumin g/dl		A/G Ratio		Calcium mg/dl		Inorganic Phosphorus mg/dl		Na mmol/l		K mmol/l		Cl mmol/l	
			Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS	0	Mean	25.2	47.8	6.68	7.20	3.48	3.62	1.093	1.012	9.65	9.92	8.90	8.30	143.8	143.7	4.48	4.55	100.7	100.2
		S.D.	6.3	18.3	0.23	0.28	0.08	0.08	0.078	0.042	0.21	0.21	0.38	0.52	0.8	1.0	0.20	0.27	1.2	0.8
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS	40	Mean	35.0		6.80		3.50		1.062		9.67		8.60		144.0		4.45		100.3	
		S.D.	5.3		0.28		0.09		0.040		0.29		0.45		0.6		0.20		1.0	
		n	6		6		6		6		6		6		6		6		6	
ZnS	200	Mean	35.8		6.75		3.47		1.057		9.65		8.52		143.5		4.55		101.2	
		S.D.	13.3		0.19		0.05		0.037		0.10		0.43		0.5		0.24		1.2	
		n	6		6		6		6		6		6		6		6		6	
ZnS	1000	Mean	31.0	51.0	6.87	7.12	3.48	3.53	1.030	0.992	9.63	9.85	8.22	8.03	144.0	142.7	4.38	4.48	100.7	99.7
		S.D.	18.2	20.6	0.27	0.41	0.13	0.08	0.038	0.080	0.21	0.19	0.35	0.34	0.6	0.8	0.28	0.23	1.0	1.5
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 9 Blood Chemistry - Summary Female

Test Substance	Dose (mg/kg)		ASAT (GOT) U/l		ALAT (GPT) U/l		γGT U/l		ALP U/l		Total Bilirubin mg/dl		Urea Nitrogen mg/dl		Creatinine mg/dl		Glucose mg/dl		Total Cholesterol mg/dl	
			Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS	0	Mean	77.7	83.5	21.0	19.5	1.3	1.2	324.5	305.8	0.00	0.00	14.53	17.08	0.48	0.53	118.3	122.7	73.0	68.3
		S.D.	14.9	8.3	9.8	2.3	0.5	0.4	69.8	76.3	0.00	0.00	1.64	2.57	0.08	0.05	8.6	20.7	14.5	9.4
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS	40	Mean	80.0		18.3		1.2		311.0		0.00		13.32		0.45		110.3		74.8	
		S.D.	11.2		1.2		0.4		91.3		0.00		2.08		0.08		11.0		14.8	
		n	6		6		6		6		6		6		6		6		6	
ZnS	200	Mean	85.5		18.5		1.5		359.8		0.00		14.77		0.53		110.3		63.5	
		S.D.	21.8		4.5		0.5		64.5		0.00		2.07		0.05		6.4		16.8	
		n	6		6		6		6		6		6		6		6		6	
ZnS	1000	Mean	68.2	72.7*	16.3	20.3	1.2	1.0	301.8	234.8	0.00	0.00	14.48	16.37	0.47	0.48	118.3	126.2	61.7	80.2
		S.D.	8.9	4.6	2.7	4.4	0.4	0.0	115.1	108.1	0.00	0.00	0.95	2.49	0.05	0.04	11.6	11.9	12.7	10.0
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, $P<0.05$; **, $P<0.01$.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Table 9 Blood Chemistry - Summary — Female

Test Substance	Dose(mg/kg)		Triglyceride mg/dl		Total Protein g/dl		Albumin g/dl		A/G Ratio		Calcium mg/dl		Inorganic Phosphorus mg/dl		Na mmol/l		K mmol/l		Cl mmol/l	
			Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS	0	Mean	17.2	12.2	6.67	6.85	3.60	3.55	1.177	1.077	9.33	9.52	7.47	7.40	143.7	142.7	4.23	4.28	102.2	102.2
		S.D.	8.5	1.2	0.31	0.27	0.18	0.15	0.066	0.044	0.22	0.12	0.73	0.58	1.6	0.5	0.49	0.28	2.0	1.5
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS	40	Mean	12.5		6.45		3.43		1.140		9.30		7.63		143.2		4.42		102.0	
		S.D.	6.4		0.28		0.14		0.074		0.33		0.45		1.2		0.21		1.7	
		n	6		6		6		6		6		6		6		6		6	
ZnS	200	Mean	10.2		6.70		3.48		1.083		9.55		8.05		143.7		4.87		102.3	
		S.D.	3.2		0.44		0.22		0.039		0.71		1.51		1.9		1.94		1.5	
		n	6		6		6		6		6		6		6		6		6	
ZnS	1000	Mean	8.3	13.7	6.40	6.90	3.40	3.63	1.137	1.115	9.23	9.52	7.05	6.95	142.5	143.0	4.18	4.17	102.8	103.2
		S.D.	2.1	4.3	0.17	0.34	0.06	0.16	0.062	0.042	0.38	0.32	0.63	0.49	1.4	1.1	0.17	0.27	1.8	1.6
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 10 Urinalysis - Summary Male

Study No. B000875

Test Substance / Dose(mg/kg)		pH																		Protein										Glucose									
		5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	>=9	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	>=9	-	+/-	1+	2+	3+	-	+/-	1+	2+	3+	-	+/-	1+	2+	3+	-	+/-	1+	2+	3+
		Week 4									Week 6									Week 4					Week 6					Week 4					Week 6				
ZnS 0	n	0	0	1	0	0	0	1	3	1	0	0	0	0	0	0	4	2	0	0	3	3	0	0	0	0	6	0	0	6	0	0	0	0	6	0	0	0	0
ZnS 40	n	0	0	0	0	0	0	1	5	0										1	1	3	1	0						6	0	0	0	0					
ZnS 200	n	0	0	0	0	0	0	2	3	1										0	0	2	4	0						6	0	0	0	0					
ZnS 1000	n	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	1	5	0	0	0	4	2	0	0	1	4	1	0	6	0	0	0	0	6	0	0	0	0

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 10 Urinalysis - Summary

Male

Test Substance / Dose (mg/kg)		Ketones										Bilirubin								Occult Blood									
		-	+/-	1+	2+	3+	-	+/-	1+	2+	3+	-	1+	2+	3+	-	1+	2+	3+	-	+/-	1+	2+	3+	-	+/-	1+	2+	3+
		Week 4					Week 6					Week 4				Week 6				Week 4					Week 6				
ZnS 0	n	0	6	0	0	0	0	1	5	0	0	6	0	0	0	6	0	0	0	6	0	0	0	0	5	0	1	0	0
ZnS 40	n	1	3	2	0	0						6	0	0	0					5	0	0	0	1					
ZnS 200	n	0	1	5	0	0						6	0	0	0					6	0	0	0	0					
ZnS 1000	n	0	3	3	0	0	0	1	5	0	0	6	0	0	0	6	0	0	0	5	0	1	0	0	6	0	0	0	0

Significantly different from control : *, P<0.05; **, P<0.01.

Table 10 Urinalysis - Summary Male

Test Substance Dose(mg/kg)		Urobilinogen EU/dl 0.1	1.0	2.0	4.0	>=8	0.1	1.0	2.0	4.0	>=8
		Week 4					Week 6				
ZnS 0	n	6	0	0	0	0	6	0	0	0	0
ZnS 40	n	4	2	0	0	0					
ZnS 200	n	4	2	0	0	0					
ZnS 1000	n	4	2	0	0	0	6	0	0	0	0

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Table 10 Urinalysis - Summary — Female

Test Substance / Dose(mg/kg)		pH																				Protein										Glucose									
		Week 4										Week 6										Week 4					Week 6					Week 4					Week 6				
		5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	>=9		5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	>=9		-	+/-	1+	2+	3+	-	+/-	1+	2+	3+	-	+/-	1+	2+	3+	-	+/-	1+	2+	3+
ZnS 0	n	0	0	0	1	0	0	2	3	0		0	0	0	0	0	1	0	4	1	0	3	1	2	0	0	4	2	0	0	0	6	0	0	0	0	6	0	0	0	0
ZnS 40	n	0	0	0	0	0	0	2	4	0												1	1	4	0	0						6	0	0	0	0					
ZnS 200	n	0	0	0	0	0	0	1	5	0												2	3	1	0	0						6	0	0	0	0					
ZnS 1000	n	0	0	0	0	0	1	4	1	0		0	0	0	0	0	0	0	4	2	0	2	1	3	0	0	3	3	0	0	0	6	0	0	0	0	6	0	0	0	0

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 10 Urinalysis - Summary Female

Test Substance Dose(mg/kg)		Ketones										Bilirubin								Occult Blood									
		-	+/-	1+	2+	3+	-	+/-	1+	2+	3+	-	1+	2+	3+	-	1+	2+	3+	-	+/-	1+	2+	3+	-	+/-	1+	2+	3+
		Week 4					Week 6					Week 4				Week 6				Week 4					Week 6				
ZnS 0	n	2	3	1	0	0	4	2	0	0	0	6	0	0	0	6	0	0	0	6	0	0	0	0	5	1	0	0	0
ZnS 40	n	2	4	0	0	0						6	0	0	0					6	0	0	0	0					
ZnS 200	n	1	5	0	0	0						6	0	0	0					6	0	0	0	0					
ZnS 1000	n	2	4	0	0	0	3	3	0	0	0	6	0	0	0	6	0	0	0	6	0	0	0	0	6	0	0	0	0

Significantly different from control : *, P<0.05; **, P<0.01.

Test Substance Dose(mg/kg)		Urobilinogen EU/dl									
		0.1	1.0	2.0	4.0	>=8	0.1	1.0	2.0	4.0	>=8
		Week 4					Week 6				
ZnS 0	n	5	1	0	0	0	6	0	0	0	0
ZnS 40	n	2	4	0	0	0					
ZnS 200	n	5	1	0	0	0					
ZnS 1000	n	4	2	0	0	0	6	0	0	0	0

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 11 Organ Weight - Summary Male

Test Substance Dose(mg/kg)		Final Body Weight g		Brain g		Thymus mg		Heart g		Liver g		Spleen g		Kidneys g		Adrenals mg		Testes g	
		Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS 0	Mean	374.3	455.8	1.973	2.072	623.3	585.5	1.302	1.567	11.142	13.483	0.715	0.827	2.798	3.122	55.20	66.25	3.127	3.413
	S.D.	30.2	55.9	0.065	0.142	131.1	121.6	0.048	0.170	0.362	1.729	0.119	0.108	0.247	0.382	5.18	8.66	0.156	0.322
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS 40	Mean	381.5		2.035		675.5		1.385		11.475		0.755		2.692		56.22		2.727	
	S.D.	17.7		0.079		120.0		0.050		0.948		0.087		0.221		8.92		1.011	
	n	6		6		6		6		6		6		6		6		6	
ZnS 200	Mean	361.3		2.045		614.7		1.338		11.002		0.813		2.715		64.07		3.172	
	S.D.	26.6		0.105		182.2		0.202		0.931		0.240		0.293		6.23		0.237	
	n	6		6		6		6		6		6		6		6		6	
ZnS 1000	Mean	366.0	451.0	2.065	2.063	643.3	530.2	1.402	1.442	11.352	13.688	0.792	0.805	2.685	3.092	62.98	71.88	3.215	3.248
	S.D.	20.0	8.9	0.050	0.092	92.8	92.1	0.113	0.069	0.805	0.877	0.080	0.158	0.173	0.178	7.34	10.64	0.188	0.191
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Table 11 Organ Weight - Summary — Male

Test Substance	Dose(mg/kg)		Epididymides g Week 5	Epididymides g Week 7
ZnS	0	Mean	0.945	1.198
		S.D.	0.091	0.092
		n	6	6
ZnS	40	Mean	0.805	
		S.D.	0.179	
		n	6	
ZnS	200	Mean	0.908	
		S.D.	0.151	
		n	6	
ZnS	1000	Mean	0.862	1.282
		S.D.	0.076	0.124
		n	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875

Table 11　　Organ Weight - Summary　　Female

Test Substance Dose(mg/kg)		Final Body Weight g Week 5	Final Body Weight g Week 7	Brain g Week 5	Brain g Week 7	Thymus mg Week 5	Thymus mg Week 7	Heart g Week 5	Heart g Week 7	Liver g Week 5	Liver g Week 7	Spleen g Week 5	Spleen g Week 7	Kidneys g Week 5	Kidneys g Week 7	Adrenals mg Week 5	Adrenals mg Week 7	Ovaries mg Week 5	Ovaries mg Week 7
ZnS	Mean	226.7	246.0	1.832	1.905	448.3	414.3	0.855	0.872	6.653	6.605	0.462	0.482	1.628	1.733	64.10	73.92	86.50	90.85
0	S.D.	11.4	19.5	0.096	0.088	132.5	70.6	0.082	0.060	0.445	0.590	0.061	0.034	0.096	0.070	5.44	12.05	8.79	6.47
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS	Mean	222.3		1.828		476.8		0.832		6.350		0.482		1.552		64.05		83.33	
40	S.D.	13.6		0.075		48.0		0.082		0.428		0.101		0.047		2.36		15.15	
	n	6		6		6		6		6		6		6		6		6	
ZnS	Mean	213.2		1.883		556.0		0.788		6.223		0.513		1.562		63.83		84.20	
200	S.D.	21.5		0.034		142.3		0.062		0.880		0.081		0.136		8.00		11.83	
	n	6		6		6		6		6		6		6		6		6	
ZnS	Mean	215.2	258.7	1.842	1.898	408.0	458.8	0.818	0.923	6.072	7.318	0.527	0.612**	1.648	1.785	57.17	71.02	94.33	102.05
1000	S.D.	15.3	11.3	0.094	0.016	94.9	34.0	0.088	0.069	0.498	0.610	0.063	0.086	0.133	0.090	6.26	5.58	11.61	18.02
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control　　: *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 12 Relative Organ Weight - Summary

Study No. B000875

Male

Test Substance	Dose(mg/kg)		Final Body Weight g		Brain %		Thymus x10⁻³%		Heart %		Liver %		Spleen %		Kidneys %		Adrenals x10⁻³%		Testes %	
			Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS	0	Mean	374.3	455.8	0.528	0.458	165.93	128.07	0.348	0.345	2.990	2.960	0.190	0.182	0.748	0.685	14.85	14.58	0.838	0.753
		S.D.	30.2	55.9	0.041	0.038	28.28	18.80	0.028	0.042	0.169	0.170	0.024	0.015	0.034	0.044	2.10	1.52	0.052	0.065
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS	40	Mean	381.5		0.533		176.68		0.363		3.008		0.198		0.707		14.73		0.715	
		S.D.	17.7		0.019		27.36		0.020		0.197		0.017		0.045		2.35		0.264	
		n	6		6		6		6		6		6		6		6		6	
ZnS	200	Mean	361.3		0.568		168.37		0.372		3.045		0.222		0.750		17.78		0.880	
		S.D.	26.6		0.025		43.01		0.035		0.114		0.050		0.052		1.95		0.066	
		n	6		6		6		6		6		6		6		6		6	
ZnS	1000	Mean	366.0	451.0	0.567	0.455	175.43	117.42	0.382	0.320	3.103	3.035	0.217	0.178	0.732	0.685	17.23	15.98	0.880	0.722
		S.D.	20.0	8.9	0.035	0.016	19.73	19.42	0.012	0.017	0.174	0.183	0.023	0.038	0.016	0.030	1.92	2.59	0.030	0.048
		n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875

Table 12　　Relative Organ Weight - Summary　　Male

Test Substance	Dose(mg/kg)		Epididymides % Week 5	Epididymides % Week 7
ZnS	0	Mean	0.252	0.263
		S.D.	0.033	0.025
		n	6	6
ZnS	40	Mean	0.212	
		S.D.	0.049	
		n	6	
ZnS	200	Mean	0.252	
		S.D.	0.026	
		n	6	
ZnS	1000	Mean	0.235	0.283
		S.D.	0.019	0.029
		n	6	6

Significantly different from control　　: ＊, P<0.05; ＊＊, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Table 12 Relative Organ Weight - Summary Female

Test Substance Dose(mg/kg)		Final Body Weight g		Brain %		Thymus x10⁻³%		Heart %		Liver %		Spleen %		Kidneys %		Adrenals x10⁻³%		Ovaries x10⁻³%	
		Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
ZnS 0	Mean	226.7	246.0	0.807	0.777	196.05	168.20	0.377	0.355	2.937	2.687	0.205	0.198	0.718	0.705	28.28	29.87	38.12	37.02
	S.D.	11.4	19.5	0.052	0.056	51.05	24.42	0.039	0.039	0.131	0.141	0.027	0.021	0.043	0.062	1.95	2.48	3.09	2.63
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
ZnS 40	Mean	222.3		0.825		215.12		0.373		2.857		0.217		0.698		28.93		37.50	
	S.D.	13.6		0.034		25.33		0.022		0.111		0.034		0.027		2.34		6.61	
	n	6		6		6		6		6		6		6		6		6	
ZnS 200	Mean	213.2		0.892		259.62*		0.370		2.913		0.242		0.735		30.05		39.47	
	S.D.	21.5		0.081		52.27		0.018		0.211		0.031		0.032		3.60		3.16	
	n	6		6		6		6		6		6		6		6		6	
ZnS 1000	Mean	215.2	258.7	0.858	0.737	189.12	177.75	0.380	0.357	2.820	2.828	0.242	0.238*	0.768	0.690	26.57	27.57	44.00	39.45
	S.D.	15.3	11.3	0.076	0.032	38.54	16.25	0.023	0.023	0.085	0.141	0.022	0.034	0.041	0.013	2.10	3.07	6.02	6.65
	n	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 13 Necropsy Findings - Summary Scheduled Sacrifice (Week 5)

Study No. B000875

Organ / Findings	Sex :	Male				Female			
	Test Substance :	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg) :	0	40	200	1000	0	40	200	1000
	Number of Animals :	6	6	6	6	6	6	6	6
	Number of Animals Examined :	〈6〉	〈6〉	〈6〉	〈6〉	〈6〉	〈6〉	〈6〉	〈6〉
Spleen									
Accessory spleen		1	0	0	0	0	0	0	0
Scar		0	0	1	0	0	0	0	0
Liver									
Hepatodiaphragmatic nodule		0	0	0	0	0	1	0	0
Kidney									
Cyst		0	0	2	0	0	0	0	0
Testis									
Small		0	1	0	0	0	0	0	0
Epididymis									
Small		0	1	0	0	0	0	0	0
Thyroid									
Nodule		0	1	0	0	0	0	0	0
Skin									
Crust		0	1	1	1	0	0	0	0
Loss of hair		1	0	1	0	0	1	0	0

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Table 14 Necropsy Findings - Summary Scheduled Sacrifice (Week 7)

	Sex	Male		Female	
	Test Substance	ZnS	ZnS	ZnS	ZnS
Organ	Dose (mg/kg)	0	1000	0	1000
Findings	Number of Animals	6	6	6	6
	Number of Animals Examined	<6>	<6>	<6>	<6>
Lung					
Brown patch		0	1	0	0
Kidney					
Cyst		1	0	0	0

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 15 Histological Findings - Summary Scheduled Sacrifice (Week 5)

Study No. B000875

Organ / Findings	Sex		Male				Female			
	Test Substance		ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)		0	40	200	1000	0	40	200	1000
	Number of Animals		6	6	6	6	6	6	6	6
Heart			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Mandibular lymph node			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Mesenteric lymph node			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Thymus			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Spleen			(6)	(0)	(1)	(6)	(6)	(0)	(0)	(6)
Microgranuloma		1	1		0	0	0			0
		2	0		0	0	0			0
		3	0		0	0	0			0
Bone marrow (femur)			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Trachea			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Lung			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Accumulation, foam cell		1	0			0	1			0
		2	0			0	0			0
		3	0			0	0			0
Stomach			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Inflammatory cell infiltration, glandular stomach, focal		1	1			1	0			0
		2	0			0	0			0
		3	0			0	0			0
Duodenum			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Jejunum			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Ileum			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Cecum			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Colon			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)

( ), Number of animals examined
1, Slight; 2, Moderate; 3, Severe
Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 15 Histological Findings - Summary Scheduled Sacrifice (Week 5)

Study No. B000875

Organ / Findings	Sex	Male				Female			
	Test Substance	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	0	40	200	1000	0	40	200	1000
	Number of Animals	6	6	6	6	6	6	6	6
Rectum		〈 6〉	〈 0〉	〈 0〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉
Liver		〈 6〉	〈 0〉	〈 0〉	〈 6〉	〈 6〉	〈 1〉	〈 0〉	〈 6〉
Fatty change, hepatocyte, periportal	1	0			0	0	0		1
	2	0			0	0	0		0
	3	0			0	0	0		0
Inflammatory cell infiltration, focal	1	4			4	3	1		4
	2	0			0	0	0		0
	3	0			0	0	0		0
Microgranuloma	1	1			2	1	1		1
	2	0			0	0	0		0
	3	0			0	0	0		0
Necrosis, focal	1	2			1	0	0		0
	2	0			0	0	0		0
	3	0			0	0	0		0
Kidney		〈 6〉	〈 0〉	〈 2〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉
Basophilic tubule	1	4		0	2	1			1
	2	0		0	0	0			0
	3	0		0	0	0			0
Cyst	1	0		2**	0	0			0
	2	0		0	0	0			0
	3	0		0	0	0			0
Hyaline droplet, tubular epithelium, proximal	1	3		2	3	0			0
	2	0		0	0	0			0
	3	0		0	0	0			0
Inflammatory cell infiltration, focal	1	0		0	0	0			1
	2	0		0	0	0			0
	3	0		0	0	0			0

〈 〉, Number of animals examined
1, Slight; 2, Moderate; 3, Severe
Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 15 Histological Findings - Summary Scheduled Sacrifice (Week 5)

Study No. B000875

Organ / Findings	Sex	Male				Female			
	Test Substance	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	0	40	200	1000	0	40	200	1000
	Number of Animals	6	6	6	6	6	6	6	6
Kidney		〈 6〉	〈 0〉	〈 2〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉
Inflammatory cell infiltration, lymphocyte,	1	2		0	1	1			1
interstitium, focal	2	0		0	0	0			0
	3	0		0	0	0			0
Urinary bladder		〈 6〉	〈 0〉	〈 0〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉
Testis		〈 6〉	〈 1〉	〈 0〉	〈 6〉				
Atrophy, seminiferous tubule, diffuse	1	0	1		0				
	2	0	0		0				
	3	0	0		0				
Hyperplasia, interstitial cell, diffuse	1	0	1		0				
	2	0	0		0				
	3	0	0		0				
Epididymis		〈 6〉	〈 1〉	〈 0〉	〈 6〉				
Decrease in sperm	1	0	0		0				
	2	0	0		0				
	3	0	1		0				
Inflammatory cell infiltration, lymphocyte, focal	1	4	0		4				
	2	0	0		0				
	3	0	0		0				
Prostate		〈 6〉	〈 0〉	〈 0〉	〈 6〉				
Inflammatory cell infiltration, focal	1	0			2				
	2	2			0				
	3	0			0				
Ovary						〈 6〉	〈 0〉	〈 0〉	〈 6〉
Cyst, follicle	1					0			2
	2					0			0
	3					0			0

〈 〉, Number of animals examined
1, Slight; 2, Moderate; 3, Severe
Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Table 15 Histological Findings - Summary Scheduled Sacrifice (Week 5)

Organ / Findings	Sex		Male				Female			
	Test Substance		ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)		0	40	200	1000	0	40	200	1000
	Number of Animals		6	6	6	6	6	6	6	6
Ovary							(6)	(0)	(0)	(6)
Cyst, corpus luteum		1					1			0
		2					0			0
		3					0			0
Uterus							(6)	(0)	(0)	(6)
Dilatation, lumen		1					1			0
		2					0			0
		3					0			0
Vagina							(6)	(0)	(0)	(6)
Hyperplasia, mucosal epithelium		1					1			0
		2					0			0
		3					0			0
Inflammatory cell infiltration, diffuse		1					0			1
		2					0			0
		3					0			0
Pituitary			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Thyroid			(6)	(1)	(0)	(6)	(6)	(0)	(0)	(6)
Ectopic thymic tissue		1	2	1		1	0			2
		2	0	0		0	0			0
		3	0	0		0	0			0
Ultimobranchial remnant		1	1	0		1	1			1
		2	0	0		0	0			0
		3	0	0		0	0			0
Parathyroid			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Adrenal			(6)	(0)	(0)	(6)	(6)	(0)	(0)	(6)
Increase in lipid droplet, fascicular zone		1	1			1	0			0
		2	0			0	0			0
		3	0			0	0			0

( ), Number of animals examined
1, Slight; 2, Moderate; 3, Severe
Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 15 Histological Findings - Summary Scheduled Sacrifice (Week 5)

Study No. B000875

Organ / Findings	Sex		Male				Female			
	Test Substance		ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)		0	40	200	1000	0	40	200	1000
	Number of Animals		6	6	6	6	6	6	6	6
Brain			〈 6〉	〈 0〉	〈 0〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉
Spinal cord			〈 6〉	〈 0〉	〈 0〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉
Sciatic nerve			〈 6〉	〈 0〉	〈 0〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉
Skin			〈 1〉	〈 1〉	〈 2〉	〈 1〉	〈 0〉	〈 1〉	〈 0〉	〈 0〉
Atrophy, hair follicle		1	0	0	0	0		1		
		2	0	0	0	0		0		
		3	0	0	0	0		0		
Crust		1	0	0	2	0		0		
		2	0	0	0	0		0		
		3	0	0	0	0		0		
Dermatitis, focal		1	0	1	0	1		0		
		2	0	0	0	0		0		
		3	0	0	0	0		0		
Subcutis			〈 1〉	〈 1〉	〈 2〉	〈 1〉	〈 0〉	〈 0〉	〈 0〉	〈 0〉
Inflammatory cell infiltration, focal		1	1	1	2	1				
		2	0	0	0	0				
		3	0	0	0	0				
Bone (femur)			〈 6〉	〈 0〉	〈 0〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉
Eyeball			〈 6〉	〈 0〉	〈 0〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉
Harderian gland			〈 6〉	〈 0〉	〈 0〉	〈 6〉	〈 6〉	〈 0〉	〈 0〉	〈 6〉

〈 〉, Number of animals examined
1, Slight; 2, Moderate; 3, Severe
Significantly different from control : *, P<0.05; **, P<0.01.

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Table 16 Histological Findings - Summary Scheduled Sacrifice (Week 7)

Study No. B000875

Organ / Findings	Sex	Male		Female	
	Test Substance	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	0	1000	0	1000
	Number of Animals	6	6	6	6
Lung		⟨0⟩	⟨1⟩	⟨0⟩	⟨0⟩
Hemorrhage, focal	1		1		
	2		0		
	3		0		
Kidney		⟨1⟩	⟨0⟩	⟨0⟩	⟨0⟩
Cyst	1	1			
	2	0			
	3	0			
Dilatation, pelvis	1	1			
	2	0			
	3	0			
Hyaline droplet, tubular epithelium, proximal	1	1			
	2	0			
	3	0			

◇, Number of animals examined
1, Slight; 2, Moderate; 3, Severe
Significantly different from control : *, P<0.05; **, P<0.01.

個体別表

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 1- 1 Clinical Sign ZnS 0 mg/kg Male Dosing Period

Study No. B000875

Animal Number	Findings	Day	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
10101	No Abnormality																																			
10102	No Abnormality																																			
10103	No Abnormality																																			
10104	No Abnormality																																			
10105	No Abnormality																																			
10106	Loss of fur	11																									+	+	+	+	+	+				
10107	Loss of fur	11																																		
10108	No Abnormality																																			
10109	No Abnormality																																			
10110	No Abnormality																																			
10111	No Abnormality																																			
10112	No Abnormality																																			

Animal Number	Findings	Day	18		19		20		21		22		23		24		25		26		27		28		29
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	
10101	No Abnormality																								
10102	No Abnormality																								
10103	No Abnormality																								
10104	No Abnormality																								
10105	No Abnormality																								
10106	Loss of fur	11																							+
10107	Loss of fur	11																							+
10108	No Abnormality																								
10109	No Abnormality																								
10110	No Abnormality																								
10111	No Abnormality																								
10112	No Abnormality																								

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;
11 , Forelimb;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875

Appendix 1- 2　Clinical Sign　　ZnS　　40 mg/kg　　Male　　Dosing Period

Animal Number	Findings	Day / Time	1 10	1 20	2 10	2 20	3 10	3 20	4 10	4 20	5 10	5 20	6 10	6 20	7 10	7 20	8 10	8 20	9 10	9 20	10 10	10 20	11 10	11 20	12 10	12 20	13 10	13 20	14 10	14 20	15 10	15 20	16 10	16 20	17 10	17 20
10201	Crust formation	09																																		
10202	No Abnormality																																			
10203	No Abnormality																																			
10204	Crust formation	06																																	+	+
	Crust formation	09																																	+	+
10205	No Abnormality																																			
10206	No Abnormality																																			

Animal Number	Findings	Day / Time	18 10	18 20	19 10	19 20	20 10	20 20	21 10	21 20	22 10	22 20	23 10	23 20	24 10	24 20	25 10	25 20	26 10	26 20	27 10	27 20	28 10	28 20	29
10201	Crust formation	09							+	+	+	+	+	+											
10202	No Abnormality																								
10203	No Abnormality																								
10204	Crust formation	06	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Crust formation	09	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
10205	No Abnormality																								
10206	No Abnormality																								

+ , Present;　1 , Slight;　2 , Moderate;　3 , Severe;
Time 10 , Just before dose.;　Time 20 , Just after dose.;
06 , Neck;　09 , Back;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 1- 3 Clinical Sign — ZnS — 200 mg/kg — Male — Dosing Period

Animal Number	Findings	Day / Time	1 10	1 20	2 10	2 20	3 10	3 20	4 10	4 20	5 10	5 20	6 10	6 20	7 10	7 20	8 10	8 20	9 10	9 20	10 10	10 20	11 10	11 20	12 10	12 20	13 10	13 20	14 10	14 20	15 10	15 20	16 10	16 20	17 10	17 20
10301	No Abnormality																																			
10302	No Abnormality																																			
10303	Crust formation	09																																		
10304	No Abnormality																																			
10305	No Abnormality																																			
10306	Loss of fur	11																																		

Animal Number	Findings	Day / Time	18 10	18 20	19 10	19 20	20 10	20 20	21 10	21 20	22 10	22 20	23 10	23 20	24 10	24 20	25 10	25 20	26 10	26 20	27 10	27 20	28 10	28 20	29
10301	No Abnormality																								
10302	No Abnormality																								
10303	Crust formation	09																							+
10304	No Abnormality																								
10305	No Abnormality																								
10306	Loss of fur	11																					+	+	+

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;
11 , Forelimb; 09 , Back;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 1- 4 Clinical Sign — ZnS — 1000 mg/kg — Male — Dosing Period

Animal Number	Findings	Day / Time	1 10	1 20	2 10	2 20	3 10	3 20	4 10	4 20	5 10	5 20	6 10	6 20	7 10	7 20	8 10	8 20	9 10	9 20	10 10	10 20	11 10	11 20	12 10	12 20	13 10	13 20	14 10	14 20	15 10	15 20	16 10	16 20	17 10	17 20
10401	No Abnormality																																			
10402	No Abnormality																																			
10403	No Abnormality																																			
10404	No Abnormality																																			
10405	No Abnormality																																			
10406	Scratched wound	09																												+						
	Crust formation	06																													+	+	+	+	+	+
	Crust formation	09																											+		+	+	+	+	+	+
10407	No Abnormality																																			
10408	No Abnormality																																			
10409	Loss of fur	03																																		
	Scratched wound	03																											+	+						
	Crust formation	03																									+	+			+	+	+	+	+	+
	Crust formation	06																																		
10410	No Abnormality																																			
10411	No Abnormality																																			
10412	No Abnormality																																			

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;
03 , Face; 06 , Neck; 09 , Back;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 1- 4 Clinical Sign ZnS 1000 mg/kg Male Dosing Period

Animal Number	Findings	Day	18		19		20		21		22		23		24		25		26		27		28		29
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	
10401	No Abnormality																								
10402	No Abnormality																								
10403	No Abnormality																								
10404	No Abnormality																								
10405	No Abnormality																								
10406	Scratched wound	09																							
	Crust formation	06	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
	Crust formation	09	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
10407	No Abnormality																								
10408	No Abnormality																								
10409	Loss of fur	03																			+	+	+	+	+
	Scratched wound	03																							
	Crust formation	03	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
	Crust formation	06							+	+	+	+	+	+											
10410	No Abnormality																								
10411	No Abnormality																								
10412	No Abnormality																								

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;
03 , Face; 06 , Neck; 09 , Back;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 1- 5 Clinical Sign — ZnS — 0 mg/kg — Female — Dosing Period

Animal Number	Findings	Day	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
50101	No Abnormality																																			
50102	No Abnormality																																			
50103	No Abnormality																																			
50104	No Abnormality																																			
50105	No Abnormality																																			
50106	No Abnormality																																			
50107	No Abnormality																																			
50108	No Abnormality																																			
50109	No Abnormality																																			
50110	No Abnormality																																			
50111	No Abnormality																																			
50112	No Abnormality																																			

Animal Number	Findings	Day	18		19		20		21		22		23		24		25		26		27		28		29	
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20		
50101	No Abnormality																									
50102	No Abnormality																									
50103	No Abnormality																									
50104	No Abnormality																									
50105	No Abnormality																									
50106	No Abnormality																									
50107	No Abnormality																									
50108	No Abnormality																									
50109	No Abnormality																									
50110	No Abnormality																									
50111	No Abnormality																									
50112	No Abnormality																									

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 1- 6 Clinical Sign — ZnS — 40 mg/kg — Female — Dosing Period

Animal Number	Findings	Day	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
50201	No Abnormality																																			
50202	No Abnormality																																			
50203	No Abnormality																																			
50204	No Abnormality																																			
50205	No Abnormality																																			
50206	Loss of fur	11																																		

Animal Number	Findings	Day	18		19		20		21		22		23		24		25		26		27		28		29
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	
50201	No Abnormality																								
50202	No Abnormality																								
50203	No Abnormality																								
50204	No Abnormality																								
50205	No Abnormality																								
50206	Loss of fur	11																							+

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;
11 , Forelimb;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 1- 7 Clinical Sign — ZnS — 200 mg/kg — Female — Dosing Period

Animal Number	Findings	Day	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
50301	No Abnormality																																			
50302	No Abnormality																																			
50303	No Abnormality																																			
50304	No Abnormality																																			
50305	No Abnormality																																			
50306	No Abnormality																																			

Animal Number	Findings	Day	18		19		20		21		22		23		24		25		26		27		28		29	
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20		
50301	No Abnormality																									
50302	No Abnormality																									
50303	No Abnormality																									
50304	No Abnormality																									
50305	No Abnormality																									
50306	No Abnormality																									

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 1- 8 Clinical Sign — ZnS — 1000 mg/kg — Female — Dosing Period

Animal Number	Findings	Day	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20
50401	No Abnormality																																			
50402	No Abnormality																																			
50403	No Abnormality																																			
50404	No Abnormality																																			
50405	No Abnormality																																			
50406	No Abnormality																																			
50407	No Abnormality																																			
50408	No Abnormality																																			
50409	Loss of fur	11																																		
50410	No Abnormality																																			
50411	No Abnormality																																			
50412	No Abnormality																																			

Animal Number	Findings	Day	18		19		20		21		22		23		24		25		26		27		28		29	
		Time	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20	10	20		
50401	No Abnormality																									
50402	No Abnormality																									
50403	No Abnormality																									
50404	No Abnormality																									
50405	No Abnormality																									
50406	No Abnormality																									
50407	No Abnormality																									
50408	No Abnormality																									
50409	Loss of fur	11																					+	+	+	
50410	No Abnormality																									
50411	No Abnormality																									
50412	No Abnormality																									

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;
Time 10 , Just before dose.; Time 20 , Just after dose.;
11 , Forelimb;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 2- 1 Clinical Sign — ZnS — 0 mg/kg — Male — Recovery Peiod

Animal Number	Findings	Day / Time	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
10107	Loss of fur	11	+	+	+	+	+	+	+	+	+	+	+	+	+		
10108	No Abnormality																
10109	No Abnormality																
10110	No Abnormality																
10111	No Abnormality																
10112	No Abnormality																

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;

11 , Forelimb;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 2- 2 Clinical Sign ZnS 1000 mg/kg Male Recovery Peiod

Animal Number	Findings	Day Time	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
10407	No Abnormality																
10408	No Abnormality																
10409	Loss of fur	03	+														
10410	No Abnormality																
10411	No Abnormality																
10412	No Abnormality																

+ , Present; 1 , Slight; 2 , Moderate; 3 , Severe;

03 , Face;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 2- 3 Clinical Sign — ZnS — 0 mg/kg — Female — Recovery Peiod

Animal Number	Findings	Day / Time	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
50107	No Abnormality																
50108	No Abnormality																
50109	No Abnormality																
50110	No Abnormality																
50111	No Abnormality																
50112	No Abnormality																

+, Present; 1, Slight; 2, Moderate; 3, Severe;

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875

Appendix 2- 4　　Clinical Sign　　ZnS　　1000 mg/kg　　Female　　Recovery Peiod

Animal Number	Findings	Day / Time	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
50407	No Abnormality																
50408	No Abnormality																
50409	Loss of fur	11	+	+	+	+	+	+	+	+	+	+	+	+	+		
50410	No Abnormality																
50411	No Abnormality																
50412	No Abnormality																

+ , Present;　1 , Slight;　2 , Moderate;　3 , Severe;

11 , Forelimb;

Sex	:	Male			
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 1 1 1 1 1 2 3 4 5 6 7 8 9 0 1 2	1 1 1 1 1 1 0 0 0 0 0 0 2 2 2 2 2 2 0 0 0 0 0 0 1 2 3 4 5 6	1 1 1 1 1 1 0 0 0 0 0 0 3 3 3 3 3 3 0 0 0 0 0 0 1 2 3 4 5 6	1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 0 0 0 0 0 0 0 0 0 1 1 1 1 1 2 3 4 5 6 7 8 9 0 1 2
Item Findings					
On removal from home cage					
Trauma					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Color of skin					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Soiled fur					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Condition of fur					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Exophthalmos					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Palpebral closure					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Color of mucosa					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Occurrence of secretion					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Lacrimation					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Salivation					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Reactivity on handling					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Pupil size					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide (ZnS) in Rats   Study No. B000875

Appendix 3- 1   Functional Observations, Detailed Clinical Observations (Week 0)

Sex : Male

Test Substance : ZnS, Dose (mg/kg) : 0

Item / Findings	10101	10102	10103	10104	10105	10106	10107	10108	10109	10110	10111	10112
Open field												
Diarrhea / None	+	+	+	+	+	+	+	+	+	+	+	+
Polyuria / None	+	+	+	+	+	+	+	+	+	+	+	+
Posture / Normal	+	+	+	+	+	+	+	+	+	+	+	+
Piloerection / None	+	+	+	+	+	+	+	+	+	+	+	+
Breathing / Normal	+	+	+	+	+	+	+	+	+	+	+	+
Gait / Normal	+	+	+	+	+	+	+	+	+	+	+	+
Convulsion / None	+	+	+	+	+	+	+	+	+	+	+	+
Stereotypy / None	+	+	+	+	+	+	+	+	+	+	+	+
Bizarre behavior / None	+	+	+	+	+	+	+	+	+	+	+	+

Test Substance : ZnS, Dose (mg/kg) : 40

Item / Findings	10201	10202	10203	10204	10205	10206
Open field						
Diarrhea / None	+	+	+	+	+	+
Polyuria / None	+	+	+	+	+	+
Posture / Normal	+	+	+	+	+	+
Piloerection / None	+	+	+	+	+	+
Breathing / Normal	+	+	+	+	+	+
Gait / Normal	+	+	+	+	+	+
Convulsion / None	+	+	+	+	+	+
Stereotypy / None	+	+	+	+	+	+
Bizarre behavior / None	+	+	+	+	+	+

Test Substance : ZnS, Dose (mg/kg) : 200

Item / Findings	10301	10302	10303	10304	10305	10306
Open field						
Diarrhea / None	+	+	+	+	+	+
Polyuria / None	+	+	+	+	+	+
Posture / Normal	+	+	+	+	+	+
Piloerection / None	+	+	+	+	+	+
Breathing / Normal	+	+	+	+	+	+
Gait / Normal	+	+	+	+	+	+
Convulsion / None	+	+	+	+	+	+
Stereotypy / None	+	+	+	+	+	+
Bizarre behavior / None	+	+	+	+	+	+

Test Substance : ZnS, Dose (mg/kg) : 1000

Item / Findings	10401	10402	10403	10404	10405	10406	10407	10408	10409	10410	10411	10412
Open field												
Diarrhea / None	+	+	+	+	+	+	+	+	+	+	+	+
Polyuria / None	+	+	+	+	+	+	+	+	+	+	+	+
Posture / Normal	+	+	+	+	+	+	+	+	+	+	+	+
Piloerection / None	+	+	+	+	+	+	+	+	+	+	+	+
Breathing / Normal	+	+	+	+	+	+	+	+	+	+	+	+
Gait / Normal	+	+	+	+	+	+	+	+	+	+	+	+
Convulsion / None	+	+	+	+	+	+	+	+	+	+	+	+
Stereotypy / None	+	+	+	+	+	+	+	+	+	+	+	+
Bizarre behavior / None	+	+	+	+	+	+	+	+	+	+	+	+

Sex	:	Male			
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 1 2 3 4 5 6 7 8 9 0 1 2	1 1 1 1 1 1 0 0 0 0 0 0 2 2 2 2 2 2 0 0 0 0 0 0 1 2 3 4 5 6	1 1 1 1 1 1 0 0 0 0 0 0 3 3 3 3 3 3 0 0 0 0 0 0 1 2 3 4 5 6	1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4 4 4 4 4 4 4 4 4 0 0 0 0 0 0 0 0 0 1 1 1 1 2 3 4 5 6 7 8 9 0 1 2
Item Findings					
On removal from home cage					
Trauma					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of skin					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Soiled fur					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Condition of fur					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Exophthalmos					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Palpebral closure					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of mucosa					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Occurrence of secretion					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Lacrimation					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Salivation					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Reactivity on handling					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Pupil size					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 3- 2 Functional Observations, Detailed Clinical Observations (Week 1)

Study No. B000875

Item / Findings	Sex : Male			
	Test Substance : ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg) : 0	40	200	1000
	Animal No. : 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1
	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0
	1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4 4
	0 0 0 0 0 0 0 0 0 1 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1 1
	1 2 3 4 5 6 7 8 9 0 1 2 3	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2 3
Open field				
Diarrhea				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Polyuria				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Posture				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Piloerection				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Breathing				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Gait				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Convulsion				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Stereotypy				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Bizarre behavior				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875
Appendix 3- 3　Functional Observations, Detailed Clinical Observations (Week 2)

Sex	:	Male			
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1
		0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0
		1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4 4
Item		0 0 0 0 0 0 0 0 0 1 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1 1
Findings		1 2 3 4 5 6 7 8 9 0 1 2 3	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2 3
On removal from home cage					
Trauma					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Positive (back)					+
(left nose)					+
Color of skin					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Soiled fur					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Condition of fur					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Exophthalmos					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Palpebral closure					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Color of mucosa					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Occurrence of secretion					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Lacrimation					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Salivation					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Reactivity on handling					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Pupil size					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +

Item / Findings	Sex : Male			
	Test Substance : ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg) : 0	40	200	1000
	Animal No. : 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1
	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0
	1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4 4
	0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1
	1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
Open field				
Diarrhea				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Polyuria				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Posture				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Piloerection				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Breathing				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Gait				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Convulsion				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Stereotypy				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Bizarre behavior				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +

Sex	:	Male		
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 1 1 1 1 1 2 3 4 5 6 7 8 9 0 1 2 3	1 1 1 1 1 1 0 0 0 0 0 0 2 2 2 2 2 2 0 0 0 0 0 0 1 2 3 4 5 6	1 1 1 1 1 1 0 0 0 0 0 0 3 3 3 3 3 3 0 0 0 0 0 0 1 2 3 4 5 6	1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 0 0 0 0 0 0 0 0 0 1 1 1 1 1 2 3 4 5 6 7 8 9 0 1 2 3
Item Findings					
On removal from home cage					
Trauma					
None		+ + + + + + + + + + + + +	+ + + +	+ + + + + +	+ + + + + + + + + + + + +
Positive (back)			+ +		+
(left back)					+
(left nose)					+
(neck)			+		
Color of skin					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Soiled fur					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Condition of fur					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Exophthalmos					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Palpebral closure					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Color of mucosa					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Occurrence of secretion					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Lacrimation					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Salivation					
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Reactivity on handling					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +
Pupil size					
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +

Sex	:	Male				
Test Substance	:	ZnS	ZnS	ZnS	ZnS	
Dose (mg/kg)	:	0	40	200	1000	
Animal No.	:	1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1	
		0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	
		1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4	
		0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1	
Item						
Findings		1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2	
Open field						
Diarrhea						
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +	
Polyuria						
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +	
Posture						
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +	
Piloerection						
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +	
Breathing						
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +	
Gait						
Normal		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +	
Ataxia		+				
Convulsion						
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +	
Stereotypy						
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +	
Bizarre behavior						
None		+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + + +	

Item / Findings	Sex : Male			
	Test Substance : ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg) : 0	40	200	1000
	Animal No. : 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1
	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0
	1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4
	0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 1 1 1
	1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
On removal from home cage				
Trauma				
None	+ + + + + + + + + + + + +	+ + + + +	+ + + + +	+ + + + + + + + + + + +
Positive(back)		+	+	+
Color of skin				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Soiled fur				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Condition of fur				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Exophthalmos				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Palpebral closure				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of mucosa				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Occurrence of secretion				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Lacrimation				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Salivation				
None	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Reactivity on handling				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Pupil size				
Normal	+ + + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Sex	:	Male			
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1
		0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
		1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4
Item		0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1
Findings		1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
Open field					
Diarrhea					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Polyuria					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Posture					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Piloerection					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Breathing					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Gait					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Convulsion					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Stereotypy					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Bizarre behavior					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

	Sex	:	Female			
	Test Substance	:	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	:	0	40	200	1000
	Animal No.	:	5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5 5 5 5
			0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
			1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4
Item			0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1
Findings			1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
On removal from home cage						
Trauma						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of skin						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Soiled fur						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Condition of fur						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Exophthalmos						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Palpebral closure						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of mucosa						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Occurrence of secretion						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Lacrimation						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Salivation						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Reactivity on handling						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Pupil size						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

	Sex	:	Female			
	Test Substance	:	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	:	0	40	200	1000
	Animal No.	:	5 5 5 5 5 5 5 5 5 5 5 5 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 1 1 1 1 2 3 4 5 6 7 8 9 0 1 2	5 5 5 5 5 5 0 0 0 0 0 0 2 2 2 2 2 2 0 0 0 0 0 0 1 2 3 4 5 6	5 5 5 5 5 5 0 0 0 0 0 0 3 3 3 3 3 3 0 0 0 0 0 0 1 2 3 4 5 6	5 5 5 5 5 5 5 5 5 5 5 5 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4 4 4 4 4 4 4 4 4 0 0 0 0 0 0 0 0 0 1 1 1 1 2 3 4 5 6 7 8 9 0 1 2
Item Findings						
Open field						
Diarrhea None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Polyuria None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Posture Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Piloerection None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Breathing Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Gait Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Convulsion None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Stereotypy None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Bizarre behavior None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

	Sex	:	Female			
	Test Substance	:	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	:	0	40	200	1000
	Animal No.	:	5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5 5 5 5
			0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
			1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4
Item			0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1
Findings			1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
On removal from home cage						
Trauma						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of skin						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Soiled fur						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Condition of fur						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Exophthalmos						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Palpebral closure						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of mucosa						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Occurrence of secretion						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Lacrimation						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Salivation						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Reactivity on handling						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Pupil size						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Sex :	Female			
Test Substance :	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg) :	0	40	200	1000
Animal No. :	5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5 5 5 5
	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
	1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4
Item	0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1
Findings	1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
Open field				
Diarrhea				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Polyuria				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Posture				
Normal	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Piloerection				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Breathing				
Normal	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Gait				
Normal	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Convulsion				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Stereotypy				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Bizarre behavior				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Sex	:	Female			
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5 5 5 5
		0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
		1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4
Item		0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 1 1 1
Findings		1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
On removal from home cage					
Trauma					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of skin					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Soiled fur					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Condition of fur					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Exophthalmos					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Palpebral closure					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of mucosa					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Occurrence of secretion					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Lacrimation					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Salivation					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Reactivity on handling					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Pupil size					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats Study No. B000875

Appendix 3- 8 Functional Observations, Detailed Clinical Observations (Week 2)

Item / Findings				
Sex :	Female			
Test Substance :	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg) :	0	40	200	1000
Animal No. :	5101 5102 5103 5104 5105 5106 5107 5108 5109 5110 5111 5112	5201 5202 5203 5204 5205 5206	5301 5302 5303 5304 5305 5306	5401 5402 5403 5404 5405 5406 5407 5408 5409 5410 5411 5412
Open field				
Diarrhea				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Polyuria				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Posture				
Normal	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Piloerection				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Breathing				
Normal	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Gait				
Normal	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Convulsion				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Stereotypy				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Bizarre behavior				
None	+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Sex	:	Female				
Test Substance	:	ZnS	ZnS	ZnS	ZnS	
Dose (mg/kg)	:	0	40	200	1000	
Animal No.	:	5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5 5 5 5	
		0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	
		1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4	
Item		0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1	
Findings		1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2	
On removal from home cage						
Trauma						
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Color of skin						
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Soiled fur						
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Condition of fur						
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Exophthalmos						
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Palpebral closure						
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Color of mucosa						
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Occurrence of secretion						
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Lacrimation						
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Salivation						
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Reactivity on handling						
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	
Pupil size						
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +	

Sex	:	Female			
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	5 5 5 5 5 5 5 5 5 5 5 5 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 1 1 1 1 2 3 4 5 6 7 8 9 0 1 2	5 5 5 5 5 5 0 0 0 0 0 0 2 2 2 2 2 2 0 0 0 0 0 0 1 2 3 4 5 6	5 5 5 5 5 5 0 0 0 0 0 0 3 3 3 3 3 3 0 0 0 0 0 0 1 2 3 4 5 6	5 5 5 5 5 5 5 5 5 5 5 5 0 0 0 0 0 0 0 0 0 0 0 0 4 4 4 4 4 4 4 4 4 4 4 4 0 0 0 0 0 0 0 0 0 1 1 1 1 2 3 4 5 6 7 8 9 0 1 2
Item Findings					
Open field					
Diarrhea					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Polyuria					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Posture					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Piloerection					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Breathing					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Gait					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Convulsion					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Stereotypy					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Bizarre behavior					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 3- 10 Functional Observations, Detailed Clinical Observations (Week 4)

Study No. B000875

Sex	:	Female			
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5 5 5 5
		0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
		1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4
		0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1
Item Findings		1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
On removal from home cage					
Trauma					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of skin					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Soiled fur					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Condition of fur					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Exophthalmos					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Palpebral closure					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Color of mucosa					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Occurrence of secretion					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Lacrimation					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Salivation					
None		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Reactivity on handling					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Pupil size					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

	Sex	:	Female			
	Test Substance	:	ZnS	ZnS	ZnS	ZnS
	Dose (mg/kg)	:	0	40	200	1000
	Animal No.	:	5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5 5 5 5
			0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
			1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4
Item			0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1
Findings			1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
Open field						
Diarrhea						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Polyuria						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Posture						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Piloerection						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Breathing						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Gait						
Normal			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Convulsion						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Stereotypy						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Bizarre behavior						
None			+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Sex	:	Male			
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1
		0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
		1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4
Item		0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1
Findings		1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
Additional tests					
Approach response					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Finger snap response					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Righting reflex, drop method(first)					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Righting reflex, drop method(second)					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 4- 2 Functional Observations, Sensory Reactivity to Stimuli (Week 4)

Sex	:	Female			
Test Substance	:	ZnS	ZnS	ZnS	ZnS
Dose (mg/kg)	:	0	40	200	1000
Animal No.	:	5 5 5 5 5 5 5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5	5 5 5 5 5 5 5 5 5 5 5 5
		0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
		1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2	3 3 3 3 3 3	4 4 4 4 4 4 4 4 4 4 4 4
Item		0 0 0 0 0 0 0 0 0 1 1 1	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 1 1 1
Findings		1 2 3 4 5 6 7 8 9 0 1 2	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6 7 8 9 0 1 2
Additional tests					
Approach response					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Finger snap response					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Righting reflex, drop method(first)					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +
Righting reflex, drop method(second)					
Normal		+ + + + + + + + + + + +	+ + + + + +	+ + + + + +	+ + + + + + + + + + + +

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 5- 1 Functional Observations, Grip Strength (Week 4) — ZnS — 0 mg/kg — Male — Unit : g

Animal Number	Forelimbs Average	Hindlimbs Average
10101	1119.5	521.5
10102	989.0	612.5
10103	833.5	469.0
10104	734.0	567.5
10105	801.0	541.0
10106	884.5	744.0
10107	1044.5	650.5
10108	990.5	561.0
10109	876.0	492.5
10110	822.5	638.0
10111	598.5	382.5
10112	846.5	397.5

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 5- 2 Functional Observations, Grip Strength (Week 4) ZnS 40 mg/kg Male

Study No. B000875
Unit : g

Animal Number	Forelimbs Average	Hindlimbs Average
10201	719.0	524.0
10202	858.5	579.0
10203	721.5	662.5
10204	1055.0	601.5
10205	809.5	512.0
10206	860.0	574.0

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875
Appendix 5- 3　Functional Observations, Grip Strength (Week 4)　ZnS　200 mg/kg　Male　　Unit : g

Animal Number	Forelimbs Average	Hindlimbs Average
10301	858.0	602.5
10302	877.5	593.5
10303	803.5	658.5
10304	730.0	473.5
10305	876.5	435.5
10306	825.5	630.0

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 5- 4 Functional Observations, Grip Strength (Week 4) — ZnS — 1000 mg/kg — Male — Unit : g

Animal Number	Forelimbs Average	Hindlimbs Average
10401	985.0	573.5
10402	873.5	568.5
10403	1076.0	670.0
10404	685.0	428.0
10405	799.5	445.5
10406	816.5	555.5
10407	688.0	562.5
10408	670.0	479.0
10409	801.0	589.5
10410	553.0	490.5
10411	723.0	476.0
10412	812.5	510.5

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875
Appendix 5- 5　Functional Observations, Grip Strength (Week 4)　ZnS　0 mg/kg　Female　Unit : g

Animal Number	Forelimbs Average	Hindlimbs Average
50101	768.5	306.0
50102	612.5	518.0
50103	815.0	633.5
50104	673.5	575.5
50105	558.0	409.5
50106	521.5	654.0
50107	347.0	244.5
50108	728.0	446.0
50109	833.5	434.0
50110	594.5	405.0
50111	645.5	366.5
50112	821.5	439.0

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 5- 6 Functional Observations, Grip Strength (Week 4) ZnS 40 mg/kg Female

Study No. B000875
Unit : g

Animal Number	Forelimbs Average	Hindlimbs Average
50201	573.5	488.5
50202	709.0	512.0
50203	569.0	452.0
50204	561.0	393.5
50205	719.0	410.5
50206	389.5	370.5

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 5- 7 Functional Observations, Grip Strength (Week 4) — ZnS — 200 mg/kg — Female — Unit : g

Animal Number	Forelimbs Average	Hindlimbs Average
50301	663.0	328.0
50302	861.5	591.5
50303	498.5	326.0
50304	598.0	401.5
50305	688.0	539.0
50306	700.0	438.5

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 5- 8 Functional Observations, Grip Strength (Week 4) ZnS 1000 mg/kg Female

Study No. B000875
Unit : g

Animal Number	Forelimbs Average	Hindlimbs Average
50401	499.0	539.0
50402	893.5	462.0
50403	604.5	352.0
50404	571.0	421.5
50405	702.5	404.0
50406	461.0	377.0
50407	802.0	681.5
50408	767.5	573.5
50409	605.5	432.0
50410	631.5	574.5
50411	680.5	361.5
50412	765.5	315.0

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875

Appendix 6- 1　Functional Observations, Motor Activity (Week 4)　　ZnS　0 mg/kg　Male

Animal Number	Time: 10 / Unit: count/ 10min	20 count/ 10min	30 count/ 10min	40 count/ 10min	50 count/ 10min	60 count/ 10min	Total count/ hour
10101	3227	1410	0	176	32	81	4926
10102	2543	2592	1912	856	37	6	7946
10103	3151	2172	299	30	87	72	5811
10104	2904	1731	238	74	181	17	5145
10105	3159	2709	2162	689	11	11	8741
10106	2864	2095	351	16	45	9	5380
10107	3265	2878	1954	1391	97	21	9606
10108	2705	2096	1425	1598	702	15	8541
10109	3488	3088	1865	68	18	91	8618
10110	2200	958	5	9	47	74	3293
10111	2894	1729	650	20	29	28	5350
10112	2756	2135	470	94	31	93	5579

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 6- 2 Functional Observations, Motor Activity (Week 4) ZnS 40 mg/kg Male

Animal Number	Time: 10 Unit: count/ 10min	20 count/ 10min	30 count/ 10min	40 count/ 10min	50 count/ 10min	60 count/ 10min	Total count/ hour
10201	3256	2561	2041	2170	985	38	11051
10202	3124	2713	2054	887	6	40	8824
10203	2902	2219	1311	23	0	36	6491
10204	3024	2453	1477	127	3	4	7088
10205	2905	2242	1345	228	18	106	6844
10206	2815	1763	1346	113	51	55	6143

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 6- 3 Functional Observations, Motor Activity (Week 4) — ZnS — 200 mg/kg — Male

Animal Number	Time: / Unit:	10 count/ 10min	20 count/ 10min	30 count/ 10min	40 count/ 10min	50 count/ 10min	60 count/ 10min	Total count/ hour
10301		2757	2208	1175	229	0	5	6374
10302		3065	2500	2413	955	96	49	9078
10303		2877	1947	394	42	10	35	5305
10304		2597	2766	1782	472	84	28	7729
10305		2739	1191	52	33	6	95	4116
10306		2313	742	6	15	69	1	3146

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875

Appendix 6- 4　Functional Observations, Motor Activity (Week 4)　　ZnS　1000 mg/kg　Male

Animal Number	Time: 10 Unit: count/ 10min	20 count/ 10min	30 count/ 10min	40 count/ 10min	50 count/ 10min	60 count/ 10min	Total count/ hour
10401	2838	2187	1477	655	415	137	7709
10402	2889	1876	2087	1151	61	0	8064
10403	2894	2258	1677	808	101	13	7751
10404	2672	1351	468	6	5	46	4548
10405	3219	2706	1616	60	6	10	7617
10406	2805	2129	1827	1700	197	106	8764
10407	2887	1721	1472	337	0	5	6422
10408	2917	1223	66	66	17	19	4308
10409	2785	2090	680	0	18	18	5591
10410	2710	1588	535	63	18	32	4946
10411	2455	1489	239	0	6	8	4197
10412	3253	2282	2101	313	17	98	8064

Appendix 6- 5 Functional Observations, Motor Activity (Week 4) ZnS 0 mg/kg Female

Animal Number	Time: 10 Unit: count/ 10min	20 count/ 10min	30 count/ 10min	40 count/ 10min	50 count/ 10min	60 count/ 10min	Total count/ hour
50101	2567	960	48	53	72	40	3740
50102	2932	2215	483	26	0	34	5690
50103	3073	2108	148	246	17	8	5600
50104	2992	1659	326	81	51	50	5159
50105	2950	2327	488	4	78	39	5886
50106	3760	2475	648	38	19	33	6973
50107	2516	1331	530	33	14	61	4485
50108	2740	2094	1000	301	13	102	6250
50109	2560	2196	2377	1956	1999	1039	12127
50110	2449	1481	60	0	0	28	4018
50111	3045	1942	63	13	2	3	5068
50112	2984	996	0	702	16	67	4765

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 6- 6 Functional Observations, Motor Activity (Week 4) ZnS 40 mg/kg Female

Animal Number	Time: 10 Unit: count/ 10min	20 count/ 10min	30 count/ 10min	40 count/ 10min	50 count/ 10min	60 count/ 10min	Total count/ hour
50201	2965	2703	1996	156	3	42	7865
50202	3137	1252	286	35	13	36	4759
50203	3153	3080	1976	770	7	779	9765
50204	2453	2242	761	22	20	2	5500
50205	2721	2361	1883	986	0	3	7954
50206	2725	1933	340	17	6	47	5068

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 6- 7 Functional Observations, Motor Activity (Week 4) ZnS 200 mg/kg Female

Animal Number	Time: 10	20	30	40	50	60	Total
	Unit: count/ 10min	count/ 10min	count/ 10min	count/ 10min	count/ 10min	count/ 10min	count/ hour
50301	2706	1718	133	30	36	26	4649
50302	3099	2496	1580	1083	193	22	8473
50303	3492	2496	1912	150	7	84	8141
50304	2880	1802	53	47	6	40	4828
50305	3323	2642	2330	2681	1333	41	12350
50306	2506	2237	1583	1328	898	4	8556

Twenty-eight-day Repeated Dose Oral Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 6- 8 Functional Observations, Motor Activity (Week 4) — ZnS — 1000 mg/kg — Female

Animal Number	Time: 10 / Unit: count/ 10min	20 count/ 10min	30 count/ 10min	40 count/ 10min	50 count/ 10min	60 count/ 10min	Total count/ hour
50401	2549	1642	31	799	57	44	5122
50402	2190	1641	124	25	2	0	3982
50403	2900	1643	588	32	8	43	5214
50404	2542	1719	1078	186	0	0	5525
50405	2987	1209	113	24	63	397	4793
50406	2414	1851	516	26	42	39	4888
50407	2546	1443	206	55	7	51	4308
50408	3108	2162	1912	1667	233	55	9137
50409	2876	1737	286	12	13	18	4942
50410	3191	2729	1553	409	85	23	7990
50411	2736	1870	717	22	6	25	5376
50412	3090	1635	83	73	87	13	4981

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 7- 1 Body Weight ZnS 0 mg/kg Male

Unit : g

Day / Animal Number	1	8	15	22	28	29	36	42
10101	173	239	299	344	368	FB		
10102	176	238	286	326	351	FB		
10103	188	267	331	391	432	FB		
10104	183	255	313	367	397	FB		
10105	175	239	301	356	382	FB		
10106	183	256	326	395	438	FB		
10107	181	251	312	362	397	406	447	469
10108	199	275	348	415	453	462	512	542
10109	189	266	344	409	454	457	516	554
10110	177	239	293	334	361	363	388	406
10111	189	253	321	371	398	407	445	471
10112	181	249	308	344	376	377	413	439

FB:Fasted body weight

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 7- 2 Body Weight ZnS 40 mg/kg Male

Unit : g

Day / Animal Number	1	8	15	22	28	29	36	42
10201	170	227	293	365	405	FB		
10202	194	267	335	394	425	FB		
10203	183	252	313	360	390	FB		
10204	190	261	325	366	407	FB		
10205	181	251	322	382	420	FB		
10206	178	232	290	340	372	FB		

FB:Fasted body weight

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 7- 3 Body Weight ZnS 200 mg/kg Male

Unit : g

Day / Animal Number	1	8	15	22	28	29	36	42
10301	193	262	326	377	418	FB		
10302	167	227	289	338	365	FB		
10303	197	268	331	381	417	FB		
10304	186	247	302	352	378	FB		
10305	179	235	288	327	351	FB		
10306	172	234	284	330	355	FB		

FB:Fasted body weight

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 7- 4 Body Weight ZnS 1000 mg/kg Male

Unit : g

Day / Animal Number	1	8	15	22	28	29	36	42
10401	179	238	292	336	355	FB		
10402	177	237	294	341	371	FB		
10403	187	253	320	371	400	FB		
10404	181	249	314	376	415	FB		
10405	181	246	300	338	360	FB		
10406	182	247	315	364	400	FB		
10407	180	244	309	368	396	407	451	481
10408	187	253	311	356	394	400	443	475
10409	171	238	301	363	398	402	447	483
10410	182	242	306	360	397	401	455	491
10411	193	255	316	358	385	394	440	459
10412	188	260	326	372	401	405	451	481

FB:Fasted body weight

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 7- 5 Body Weight ZnS 0 mg/kg Female

Unit : g

Day / Animal Number	1	8	15	22	28	29	36	42
50101	151	187	211	236	246	FB		
50102	161	188	205	232	247	FB		
50103	147	177	204	235	252	FB		
50104	148	177	199	230	244	FB		
50105	155	171	201	222	230	FB		
50106	140	170	191	204	218	FB		
50107	144	165	185	202	211	214	234	236
50108	145	164	197	216	224	231	241	259
50109	151	174	196	229	244	252	273	277
50110	140	158	185	205	214	221	240	257
50111	143	163	176	204	212	220	238	249
50112	152	186	211	240	257	262	282	294

FB:Fasted body weight

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 7- 6 Body Weight ZnS 40 mg/kg Female

Unit : g

Day / Animal Number	1	8	15	22	28	29	36	42
50201	155	177	197	222	236	FB		
50202	144	175	203	221	237	FB		
50203	145	172	195	210	217	FB		
50204	136	162	188	209	223	FB		
50205	160	184	217	246	259	FB		
50206	146	169	198	215	237	FB		

FB:Fasted body weight

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 7- 7 Body Weight ZnS 200 mg/kg Female

Unit : g

Day / Animal Number	1	8	15	22	28	29	36	42
50301	139	155	177	184	189	FB		
50302	149	177	205	227	246	FB		
50303	136	161	182	191	209	FB		
50304	145	163	188	215	226	FB		
50305	151	184	204	226	242	FB		
50306	151	182	202	229	239	FB		

FB:Fasted body weight

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 7- 8 Body Weight ZnS 1000 mg/kg Female

Unit : g

Day / Animal Number	1	8	15	22	28	29	36	42
50401	145	176	207	225	238	FB		
50402	148	171	193	213	221	FB		
50403	149	167	179	200	211	FB		
50404	150	178	204	229	246	FB		
50405	151	181	201	212	226	FB		
50406	141	159	173	193	206	FB		
50407	146	179	209	234	249	253	265	287
50408	141	173	203	223	241	251	269	291
50409	152	181	207	224	247	248	266	275
50410	149	178	203	221	235	237	254	262
50411	149	172	196	220	230	240	258	273
50412	158	178	203	222	228	229	245	262

FB:Fasted body weight

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 8- 1 Food Consumption ZnS 0 mg/kg Male

Unit : g/animal/day

Day Animal Number	8	15	22	28	36	42
10101	23.3	26.4	26.9	28.0		
10102	24.0	25.7	25.7	26.3		
10103	25.9	27.4	28.3	29.8		
10104	25.9	28.1	29.0	29.3		
10105	24.7	26.7	28.6	29.3		
10106	25.1	28.3	31.7	32.0		
10107	24.7	26.6	28.0	28.5	29.3	29.3
10108	27.4	31.3	34.0	32.8	34.3	34.8
10109	27.3	31.1	33.3	33.5	33.4	34.8
10110	24.4	25.7	26.3	25.3	25.9	25.0
10111	25.6	28.7	30.6	30.0	31.6	31.0
10112	25.1	27.4	25.7	25.5	26.4	25.8

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 8- 2 Food Consumption ZnS 40 mg/kg Male

Unit : g/animal/day

Day Animal Number	8	15	22	28	36	42
10201	21.6	25.1	29.1	30.0		
10202	26.1	28.9	29.9	30.3		
10203	24.6	26.7	27.3	26.8		
10204	26.1	28.9	27.3	28.8		
10205	25.6	29.0	30.4	31.8		
10206	22.0	25.1	26.4	27.8		

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 8- 3 Food Consumption ZnS 200 mg/kg Male

Study No. B000875
Unit : g/animal/day

Day Animal Number	8	15	22	28	36	42
10301	26.3	28.3	29.1	30.8		
10302	21.6	25.3	25.9	26.3		
10303	26.4	28.7	29.0	29.5		
10304	25.1	25.7	27.0	26.5		
10305	23.0	25.4	25.7	26.5		
10306	23.7	25.9	26.1	25.5		

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Study No. B000875

Appendix 8- 4 Food Consumption ZnS 1000 mg/kg Male
Unit : g/animal/day

Day Animal Number	8	15	22	28	36	42
10401	23.3	24.6	26.1	24.8		
10402	22.6	25.7	26.1	26.5		
10403	24.4	27.6	27.9	28.3		
10404	24.6	27.4	29.6	30.5		
10405	24.4	26.6	26.0	25.0		
10406	23.9	27.9	27.7	29.8		
10407	23.4	26.9	27.9	26.5	28.4	29.0
10408	23.4	25.0	25.1	26.5	27.7	28.0
10409	24.0	27.3	29.6	30.5	31.1	32.0
10410	23.6	26.1	27.9	28.0	30.6	31.3
10411	26.3	28.0	28.3	27.3	29.4	28.5
10412	25.6	29.0	29.0	29.5	29.4	30.5

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 8- 5 Food Consumption ZnS 0 mg/kg Female

Unit : g/animal/day

Day Animal Number	8	15	22	28	36	42
50101	18.3	16.7	17.3	18.5		
50102	18.3	17.9	19.4	19.5		
50103	17.0	18.4	19.7	21.0		
50104	15.9	16.3	16.6	17.8		
50105	17.3	19.1	18.1	19.8		
50106	17.9	18.1	17.7	18.8		
50107	15.1	15.7	15.4	15.5	17.7	17.5
50108	15.6	17.6	17.1	18.3	18.1	18.3
50109	16.7	18.6	20.1	19.8	21.0	18.8
50110	14.9	16.3	15.7	16.3	18.4	18.3
50111	15.0	14.3	15.4	15.5	16.7	16.8
50112	18.0	18.4	19.6	20.3	21.7	20.8

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 8- 6 Food Consumption ZnS 40 mg/kg Female

Unit : g/animal/day

Day Animal Number	8	15	22	28	36	42
50201	16.7	17.1	18.1	17.5		
50202	18.0	18.7	18.0	18.3		
50203	16.6	17.0	16.9	17.0		
50204	15.4	16.3	16.4	17.0		
50205	18.1	20.1	21.6	21.0		
50206	16.0	17.1	17.9	17.5		

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 8- 7 Food Consumption ZnS 200 mg/kg Female

Unit : g/animal/day

Day Animal Number	8	15	22	28	36	42
50301	15.0	15.4	14.9	15.0		
50302	17.9	19.0	19.6	20.8		
50303	14.9	15.1	15.4	15.8		
50304	16.3	17.3	17.4	18.8		
50305	17.7	17.6	17.7	19.0		
50306	17.1	18.3	19.7	19.5		

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 8- 8 Food Consumption ZnS 1000 mg/kg Female

Unit : g/animal/day

Day Animal Number	8	15	22	28	36	42
50401	15.7	17.7	17.7	17.3		
50402	15.7	16.0	16.6	16.3		
50403	15.3	15.6	16.1	15.3		
50404	18.3	19.4	19.9	20.3		
50405	17.6	17.7	18.7	17.5		
50406	14.0	14.1	14.9	16.0		
50407	17.6	18.0	19.0	19.0	21.4	21.5
50408	16.6	17.4	17.4	18.8	20.9	19.3
50409	17.4	17.6	17.7	19.5	19.7	19.0
50410	17.3	17.6	17.3	19.0	20.1	18.3
50411	16.0	16.3	17.9	17.5	19.4	19.0
50412	17.9	17.9	17.9	18.8	19.4	18.3

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 1 Hematology ZnS 0 mg/kg Male

Animal Number	RBC x10⁴ /μl Week 5	RBC x10⁴ /μl Week 7	Hb g/dl Week 5	Hb g/dl Week 7	Ht % Week 5	Ht % Week 7	MCV fl Week 5	MCV fl Week 7	MCH pg Week 5	MCH pg Week 7	MCHC % Week 5	MCHC % Week 7	Reticulocyte Ratio ‰ Week 5	Reticulocyte Ratio ‰ Week 7	PLT x10⁴ /μl Week 5	PLT x10⁴ /μl Week 7	PT sec Week 5	PT sec Week 7
10101	781		15.6		44.2		56.6		20.0		35.3		23.1		112.9		16.3	
10102	726		15.3		42.3		58.3		21.1		36.2		25.2		104.7		16.0	
10103	762		16.2		47.7		62.6		21.3		34.0		30.5		89.6		15.7	
10104	731		15.6		43.6		59.6		21.3		35.8		29.4		95.2		15.3	
10105	782		16.3		43.7		55.9		20.8		37.3		26.6		92.7		15.2	
10106	730		15.6		43.6		59.7		21.4		35.8		32.8		106.8		14.1	
10107		841		16.2		47.5		56.5		19.3		34.1		23.8		101.2		16.4
10108		863		16.5		48.8		56.5		19.1		33.8		20.7		90.5		16.8
10109		780		15.5		45.7		58.6		19.9		33.9		26.0		77.8		15.4
10110		825		16.5		47.4		57.5		20.0		34.8		24.7		76.5		16.0
10111		803		15.5		44.3		55.2		19.3		35.0		26.3		105.7		15.8
10112		883		16.6		49.5		56.1		18.8		33.5		21.6		96.4		15.6

Animal Number	APTT sec Week 5	APTT sec Week 7
10101	16.3	
10102	17.4	
10103	15.3	
10104	16.1	
10105	17.1	
10106	16.7	
10107		15.2
10108		14.3
10109		16.6
10110		14.7
10111		15.8
10112		17.4

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats　　Study No. B000875

Appendix 9- 1　Hematology　　ZnS　　0 mg/kg　　Male

Animal Number	WBC x10² /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
10101	96.2		96		3		0		1		0		0	
10102	80.4		96		2		0		0		0		2	
10103	117.0		93		3		0		0		0		4	
10104	122.0		95		2		0		1		0		2	
10105	71.6		88		4		0		3		0		5	
10106	120.8		94		2		0		0		0		4	
10107		138.5		87		9		0		0		0		4
10108		77.6		90		7		0		2		0		1
10109		133.0		92		3		0		1		0		4
10110		112.3		95		4		0		0		0		1
10111		107.6		87		6		0		3		0		4
10112		86.6		87		9		0		3		0		1

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 9- 2 Hematology — ZnS — 40 mg/kg — Male

Animal Number	RBC x10⁴ /μl Week 5	RBC x10⁴ /μl Week 7	Hb g/dl Week 5	Hb g/dl Week 7	Ht % Week 5	Ht % Week 7	MCV fl Week 5	MCV fl Week 7	MCH pg Week 5	MCH pg Week 7	MCHC % Week 5	MCHC % Week 7	Reticulocyte Ratio ‰ Week 5	Reticulocyte Ratio ‰ Week 7	PLT x10⁴ /μl Week 5	PLT x10⁴ /μl Week 7	PT sec Week 5	PT sec Week 7
10201	764		16.3		45.9		60.1		21.3		35.5		33.2		104.3		14.1	
10202	822		16.4		47.2		57.4		20.0		34.7		27.6		111.1		15.5	
10203	727		15.3		42.2		58.0		21.0		36.3		23.2		94.0		14.7	
10204	783		15.7		43.8		55.9		20.1		35.8		32.9		100.7		15.2	
10205	788		16.4		46.8		59.4		20.8		35.0		28.5		79.0		15.2	
10206	768		16.4		45.0		58.6		21.4		36.4		28.1		104.5		14.7	

Animal Number	APTT sec Week 5	APTT sec Week 7
10201	16.3	
10202	15.2	
10203	16.9	
10204	17.5	
10205	14.5	
10206	17.0	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 2 Hematology ZnS 40 mg/kg Male

Animal Number	WBC x10² /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
10201	88.3		96		1		0		0		0		3	
10202	101.3		98		1		0		0		0		1	
10203	103.0		92		4		0		0		0		4	
10204	112.7		79		16		0		1		0		4	
10205	138.0		90		7		0		0		0		3	
10206	77.0		91		7		0		0		0		2	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 3 Hematology ZnS 200 mg/kg Male

Animal Number	RBC x10⁴ /μl Week 5	RBC x10⁴ /μl Week 7	Hb g/dl Week 5	Hb g/dl Week 7	Ht % Week 5	Ht % Week 7	MCV fl Week 5	MCV fl Week 7	MCH pg Week 5	MCH pg Week 7	MCHC % Week 5	MCHC % Week 7	Reticulocyte Ratio ‰ Week 5	Reticulocyte Ratio ‰ Week 7	PLT x10⁴ /μl Week 5	PLT x10⁴ /μl Week 7	PT sec Week 5	PT sec Week 7
10301	754		16.6		48.1		63.8		22.0		34.5		31.0		73.4		15.0	
10302	782		15.9		45.0		57.5		20.3		35.3		30.5		101.4		14.9	
10303	721		15.7		44.2		61.3		21.8		35.5		29.0		85.6		15.6	
10304	796		15.6		44.3		55.7		19.6		35.2		26.4		96.0		15.4	
10305	795		16.5		46.3		58.2		20.8		35.6		22.4		99.0		14.9	
10306	744		16.8		45.7		61.4		22.6		36.8		24.9		95.7		15.1	

Animal Number	APTT sec Week 5	APTT sec Week 7
10301	15.3	
10302	16.5	
10303	14.5	
10304	16.0	
10305	16.2	
10306	16.5	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 3 Hematology ZnS 200 mg/kg Male

Animal Number	WBC x10² /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
10301	129.8		94		1		0		2		0		3	
10302	142.6		94		4		0		2		0		0	
10303	116.6		86		8		0		0		0		6	
10304	106.5		92		5		0		0		0		3	
10305	104.6		92		7		0		0		0		1	
10306	82.2		83		10		0		0		0		7	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 4 Hematology ZnS 1000 mg/kg Male

Animal Number	RBC x10⁴ /μl Week 5	RBC x10⁴ /μl Week 7	Hb g/dl Week 5	Hb g/dl Week 7	Ht % Week 5	Ht % Week 7	MCV fl Week 5	MCV fl Week 7	MCH pg Week 5	MCH pg Week 7	MCHC % Week 5	MCHC % Week 7	Reticulocyte Ratio ‰ Week 5	Reticulocyte Ratio ‰ Week 7	PLT x10⁴ /μl Week 5	PLT x10⁴ /μl Week 7	PT sec Week 5	PT sec Week 7
10401	727		15.0		42.9		59.0		20.6		35.0		26.8		89.2		15.5	
10402	711		15.4		42.1		59.2		21.7		36.6		27.3		95.4		15.2	
10403	735		15.7		43.1		58.6		21.4		36.4		29.6		94.1		14.9	
10404	761		16.3		46.3		60.8		21.4		35.2		27.1		76.1		15.3	
10405	793		15.8		43.6		55.0		19.9		36.2		22.1		95.5		14.7	
10406	792		16.3		45.1		56.9		20.6		36.1		25.8		105.2		15.3	
10407		827		15.8		45.9		55.5		19.1		34.4		18.0		91.8		15.8
10408		828		16.0		46.8		56.5		19.3		34.2		24.7		90.6		15.8
10409		849		15.8		46.6		54.9		18.6		33.9		23.4		90.3		17.0
10410		772		15.4		46.0		59.6		19.9		33.5		26.7		96.7		15.4
10411		799		16.0		45.6		57.1		20.0		35.1		21.3		120.7		16.7
10412		805		15.2		44.1		54.8		18.9		34.5		25.3		82.2		15.1

Animal Number	APTT sec Week 5	APTT sec Week 7
10401	15.7	
10402	17.1	
10403	19.2	
10404	17.2	
10405	14.9	
10406	14.6	
10407		16.3
10408		15.4
10409		16.4
10410		15.6
10411		16.6
10412		15.7

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 4 Hematology ZnS 1000 mg/kg Male

Animal Number	WBC x10² /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
10401	78.7		97		1		0		0		0		2	
10402	91.8		87		6		0		1		0		6	
10403	90.9		87		9		0		1		0		3	
10404	118.4		88		5		0		1		0		6	
10405	137.9		92		5		0		0		0		3	
10406	133.9		89		9		0		0		0		2	
10407		81.9		90		6		0		0		0		4
10408		104.3		96		3		0		0		0		1
10409		95.4		87		11		0		1		0		1
10410		109.9		94		4		0		0		0		2
10411		129.2		83		12		0		0		0		5
10412		76.4		84		12		0		2		0		2

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 5 Hematology ZnS 0 mg/kg Female

Animal Number	RBC x10⁴ /μl Week 5	RBC x10⁴ /μl Week 7	Hb g/dl Week 5	Hb g/dl Week 7	Ht % Week 5	Ht % Week 7	MCV fl Week 5	MCV fl Week 7	MCH pg Week 5	MCH pg Week 7	MCHC % Week 5	MCHC % Week 7	Reticulocyte Ratio ‰ Week 5	Reticulocyte Ratio ‰ Week 7	PLT x10⁴ /μl Week 5	PLT x10⁴ /μl Week 7	PT sec Week 5	PT sec Week 7
50101	765		16.3		43.8		57.3		21.3		37.2		21.0		102.5		17.2	
50102	731		15.0		41.0		56.1		20.5		36.6		17.6		103.0		15.5	
50103	702		14.7		40.6		57.8		20.9		36.2		23.3		89.5		15.1	
50104	762		15.1		42.6		55.9		19.8		35.4		24.4		93.7		12.7	
50105	745		15.6		42.8		57.4		20.9		36.4		21.9		85.2		11.7	
50106	688		14.7		39.1		56.8		21.4		37.6		21.1		66.4		11.4	
50107		870		16.5		47.5		54.6		19.0		34.7		20.7		73.3		17.7
50108		786		15.1		43.6		55.5		19.2		34.6		20.8		92.5		17.1
50109		835		15.9		46.4		55.6		19.0		34.3		22.1		85.6		15.4
50110		883		16.8		48.6		55.0		19.0		34.6		29.5		82.2		17.0
50111		787		15.7		43.5		55.3		19.9		36.1		24.3		96.9		16.7
50112		784		15.4		44.2		56.4		19.6		34.8		18.8		84.0		17.2

Animal Number	APTT sec Week 5	APTT sec Week 7
50101	15.6	
50102	15.7	
50103	14.6	
50104	14.1	
50105	15.5	
50106	14.5	
50107		12.2
50108		14.9
50109		15.6
50110		14.2
50111		12.4
50112		14.2

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 5 Hematology ZnS 0 mg/kg Female

Animal Number	WBC x10² /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
50101	81.4		85		9		0		1		0		5	
50102	75.3		81		10		0		3		0		6	
50103	89.2		91		6		0		0		0		3	
50104	52.0		90		6		0		2		0		2	
50105	55.7		82		12		0		2		0		4	
50106	40.3		87		8		0		0		0		5	
50107		88.2		96		3		0		1		0		0
50108		64.3		93		5		0		0		0		2
50109		70.7		91		4		0		1		0		4
50110		68.8		92		5		0		1		0		2
50111		136.6		92		7		0		0		0		1
50112		62.8		88		9		0		1		0		2

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 6 Hematology ZnS 40 mg/kg Female

Animal Number	RBC x10⁴ /μl		Hb g/dl		Ht %		MCV fl		MCH pg		MCHC %		Reticulocyte Ratio ‰		PLT x10⁴ /μl		PT sec	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
50201	729		14.9		42.1		57.8		20.4		35.4		21.8		99.3		15.8	
50202	774		16.0		44.5		57.5		20.7		36.0		19.2		83.1		15.6	
50203	747		15.1		41.2		55.2		20.2		36.7		19.4		87.2		12.6	
50204	832		16.8		45.8		55.0		20.2		36.7		25.5		83.0		12.0	
50205	767		16.0		44.2		57.6		20.9		36.2		18.1		94.6		17.2	
50206	788		16.2		45.0		57.1		20.6		36.0		23.6		113.9		15.9	

Animal Number	APTT sec	
	Week 5	Week 7
50201	14.3	
50202	12.3	
50203	14.7	
50204	11.8	
50205	14.1	
50206	12.0	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 6 Hematology ZnS 40 mg/kg Female

Animal Number	WBC x10² /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
50201	71.0		88		9		0		0		0		3	
50202	89.7		96		2		0		1		0		1	
50203	96.2		93		2		0		1		0		4	
50204	71.5		92		2		1		1		0		4	
50205	98.6		92		2		0		1		0		5	
50206	70.5		94		4		0		0		0		2	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 9- 7 Hematology — ZnS — 200 mg/kg — Female

Animal Number	RBC x10⁴ /μl		Hb g/dl		Ht %		MCV fl		MCH pg		MCHC %		Reticulocyte Ratio ‰		PLT x10⁴ /μl		PT sec	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
50301	850		18.1		48.5		57.1		21.3		37.3		14.7		80.5		15.6	
50302	722		15.3		41.2		57.1		21.2		37.1		32.6		105.9		14.0	
50303	712		14.8		40.7		57.2		20.8		36.4		23.8		94.7		12.1	
50304	768		16.1		44.3		57.7		21.0		36.3		19.6		82.0		11.7	
50305	710		14.4		40.3		56.8		20.3		35.7		21.6		96.1		16.4	
50306	809		16.3		44.2		54.6		20.1		36.9		15.3		87.2		16.9	

Animal Number	APTT sec	
	Week 5	Week 7
50301	12.2	
50302	14.9	
50303	12.5	
50304	12.1	
50305	13.9	
50306	14.2	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 7 Hematology ZnS 200 mg/kg Female

Animal Number	WBC x10² /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
50301	136.7		95		3		0		0		0		2	
50302	115.3		88		5		0		0		0		7	
50303	67.5		90		6		0		1		0		3	
50304	43.2		88		7		0		1		0		4	
50305	87.3		92		3		0		0		0		5	
50306	55.3		89		5		0		1		0		5	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 8 Hematology ZnS 1000 mg/kg Female

Animal Number	RBC x10⁴ /μl		Hb g/dl		Ht %		MCV fl		MCH pg		MCHC %		Reticulocyte Ratio ‰		PLT x10⁴ /μl		PT sec	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
50401	714		14.5		39.5		55.3		20.3		36.7		18.4		95.2		16.5	
50402	782		16.0		43.7		55.9		20.5		36.6		20.9		96.7		16.2	
50403	729		14.8		40.8		56.0		20.3		36.3		20.9		85.7		12.8	
50404	699		15.5		42.6		60.9		22.2		36.4		20.9		79.3		12.9	
50405	604		11.6		32.6		54.0		19.2		35.6		31.3		100.9		11.3	
50406	763		15.4		42.4		55.6		20.2		36.3		21.4		84.7		11.9	
50407		799		15.5		43.7		54.7		19.4		35.5		13.6		78.3		16.9
50408		783		15.1		44.2		56.4		19.3		34.2		28.7		87.5		16.2
50409		777		15.5		44.4		57.1		19.9		34.9		21.3		79.1		16.6
50410		756		14.9		42.1		55.7		19.7		35.4		13.7		96.8		17.7
50411		812		15.5		44.1		54.3		19.1		35.1		20.4		123.7		16.4
50412		808		15.2		44.5		55.1		18.8		34.2		21.2		98.4		16.9

Animal Number	APTT sec	
	Week 5	Week 7
50401	14.5	
50402	12.7	
50403	15.3	
50404	12.6	
50405	15.9	
50406	13.6	
50407		16.5
50408		13.9
50409		12.6
50410		13.0
50411		13.3
50412		14.1

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 9- 8 . Hematology ZnS 1000 mg/kg Female

Animal Number	WBC x10^2 /μl		Lymphocyte %		Neutrophilic Segmented %		Neutrophilic Band %		Eosinophil %		Basophil %		Monocyte %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
50401	74.6		94		1		0		0		0		5	
50402	95.5		93		4		0		1		0		2	
50403	73.8		89		2		0		0		0		9	
50404	62.6		95		0		1		0		0		4	
50405	66.9		73		20		0		0		0		7	
50406	111.8		90		1		0		1		0		8	
50407		68.1		90		6		0		2		0		2
50408		79.4		89		9		0		0		0		2
50409		63.1		92		7		0		1		0		0
50410		61.6		93		7		0		0		0		0
50411		148.7		97		3		0		0		0		0
50412		56.9		91		7		0		0		0		2

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 10- 1 Blood Chemistry — ZnS — 0 mg/kg — Male

Animal Number	ASAT(GOT) U/l Week 5	ASAT(GOT) U/l Week 7	ALAT(GPT) U/l Week 5	ALAT(GPT) U/l Week 7	γGT U/l Week 5	γGT U/l Week 7	ALP U/l Week 5	ALP U/l Week 7	Total Bilirubin mg/dl Week 5	Total Bilirubin mg/dl Week 7	Urea Nitrogen mg/dl Week 5	Urea Nitrogen mg/dl Week 7	Creatinine mg/dl Week 5	Creatinine mg/dl Week 7	Glucose mg/dl Week 5	Glucose mg/dl Week 7	Total Cholesterol mg/dl Week 5	Total Cholesterol mg/dl Week 7
10101	72		28		0		509		0.0		12.9		0.4		155		62	
10102	86		21		1		664		0.0		15.3		0.4		130		42	
10103	66		21		0		365		0.0		11.7		0.4		114		63	
10104	66		23		1		625		0.0		16.2		0.5		128		40	
10105	72		20		1		591		0.0		12.6		0.4		126		54	
10106	62		25		1		593		0.0		15.6		0.5		125		51	
10107		75		26		0		542		0.0		16.0		0.4		123		52
10108		97		28		1		774		0.0		18.2		0.5		142		54
10109		80		20		1		438		0.0		18.0		0.5		146		63
10110		76		24		1		393		0.0		17.5		0.4		137		51
10111		79		26		0		580		0.0		21.1		0.5		135		54
10112		57		21		1		511		0.0		17.1		0.5		134		59

Animal Number	Triglyceride mg/dl Week 5	Triglyceride mg/dl Week 7	Total Protein g/dl Week 5	Total Protein g/dl Week 7	Albumin g/dl Week 5	Albumin g/dl Week 7	A/G Ratio Week 5	A/G Ratio Week 7	Calcium mg/dl Week 5	Calcium mg/dl Week 7	Inorganic Phosphorus mg/dl Week 5	Inorganic Phosphorus mg/dl Week 7	Na mmol/l Week 5	Na mmol/l Week 7	K mmol/l Week 5	K mmol/l Week 7	Cl mmol/l Week 5	Cl mmol/l Week 7
10101	22		6.8		3.5		1.06		9.7		8.4		144		4.2		101	
10102	19		6.8		3.5		1.06		9.4		9.3		144		4.4		100	
10103	32		6.5		3.5		1.17		9.7		8.6		145		4.5		102	
10104	20		6.3		3.4		1.17		9.6		9.2		144		4.4		102	
10105	24		6.8		3.6		1.13		9.5		8.7		143		4.6		99	
10106	34		6.9		3.4		0.97		10.0		9.2		143		4.8		100	
10107		37		7.6		3.7		0.95		10.3		8.9		143		4.9		99
10108		44		6.8		3.5		1.06		10.0		9.0		144		4.4		100
10109		84		7.2		3.6		1.00		9.7		7.8		144		4.4		101
10110		45		7.4		3.7		1.00		9.9		8.2		144		4.6		100
10111		44		7.2		3.6		1.00		9.8		8.0		142		4.8		100
10112		33		7.0		3.6		1.06		9.8		7.9		145		4.2		101

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 10- 2 Blood Chemistry ZnS 40 mg/kg Male

Animal Number	ASAT(GOT) U/l		ALAT(GPT) U/l		γGT U/l		ALP U/l		Total Bilirubin mg/dl		Urea Nitrogen mg/dl		Creatinine mg/dl		Glucose mg/dl		Total Cholesterol mg/dl	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
10201	62		24		1		537		0.0		13.5		0.4		136		78	
10202	85		27		1		740		0.0		16.8		0.4		130		69	
10203	75		28		0		608		0.0		15.8		0.5		118		63	
10204	79		24		1		464		0.0		14.0		0.4		115		48	
10205	61		20		1		629		0.0		15.7		0.4		148		65	
10206	74		19		1		595		0.0		11.8		0.4		120		40	

Animal Number	Triglyceride mg/dl		Total Protein g/dl		Albumin g/dl		A/G Ratio		Calcium mg/dl		Inorganic Phosphorus mg/dl		Na mmol/l		K mmol/l		Cl mmol/l	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
10201	44		7.2		3.6		1.00		10.0		9.0		144		4.1		99	
10202	36		7.1		3.6		1.03		10.0		8.6		143		4.7		99	
10203	34		6.5		3.4		1.10		9.4		7.9		144		4.5		101	
10204	32		6.6		3.4		1.06		9.6		9.1		145		4.5		101	
10205	36		6.7		3.5		1.09		9.7		8.7		144		4.5		101	
10206	28		6.7		3.5		1.09		9.3		8.3		144		4.4		101	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 10- 3 Blood Chemistry ZnS 200 mg/kg Male

Study No. B000875

Animal Number	ASAT(GOT) U/l Week 5	Week 7	ALAT(GPT) U/l Week 5	Week 7	γGT U/l Week 5	Week 7	ALP U/l Week 5	Week 7	Total Bilirubin mg/dl Week 5	Week 7	Urea Nitrogen mg/dl Week 5	Week 7	Creatinine mg/dl Week 5	Week 7	Glucose mg/dl Week 5	Week 7	Total Cholesterol mg/dl Week 5	Week 7
10301	78		20		1		666		0.0		13.1		0.4		133		68	
10302	71		26		1		716		0.0		13.8		0.4		131		59	
10303	91		31		2		479		0.0		15.7		0.4		127		55	
10304	59		24		0		676		0.0		17.1		0.5		151		48	
10305	74		30		1		653		0.0		13.6		0.4		126		39	
10306	72		24		1		496		0.0		15.4		0.4		151		37	

Animal Number	Triglyceride mg/dl Week 5	Week 7	Total Protein g/dl Week 5	Week 7	Albumin g/dl Week 5	Week 7	A/G Ratio Week 5	Week 7	Calcium mg/dl Week 5	Week 7	Inorganic Phosphorus mg/dl Week 5	Week 7	Na mmol/l Week 5	Week 7	K mmol/l Week 5	Week 7	Cl mmol/l Week 5	Week 7
10301	37		7.0		3.5		1.00		9.8		8.9		144		4.2		100	
10302	49		6.9		3.5		1.03		9.6		7.8		143		4.6		100	
10303	39		6.5		3.4		1.10		9.6		8.8		144		4.4		101	
10304	26		6.6		3.4		1.06		9.5		8.2		144		4.5		102	
10305	15		6.8		3.5		1.06		9.7		8.7		143		4.9		101	
10306	49		6.7		3.5		1.09		9.7		8.7		143		4.7		103	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 10- 4 Blood Chemistry ZnS 1000 mg/kg Male

Animal Number	ASAT(GOT) U/l Week 5	ASAT(GOT) U/l Week 7	ALAT(GPT) U/l Week 5	ALAT(GPT) U/l Week 7	γGT U/l Week 5	γGT U/l Week 7	ALP U/l Week 5	ALP U/l Week 7	Total Bilirubin mg/dl Week 5	Total Bilirubin mg/dl Week 7	Urea Nitrogen mg/dl Week 5	Urea Nitrogen mg/dl Week 7	Creatinine mg/dl Week 5	Creatinine mg/dl Week 7	Glucose mg/dl Week 5	Glucose mg/dl Week 7	Total Cholesterol mg/dl Week 5	Total Cholesterol mg/dl Week 7
10401	66		23		2		440		0.0		14.2		0.4		129		71	
10402	63		17		1		596		0.0		17.3		0.4		124		67	
10403	61		17		4		468		0.0		9.9		0.3		130		55	
10404	61		16		2		605		0.0		13.1		0.7		140		55	
10405	55		22		1		740		0.0		19.6		0.5		147		42	
10406	82		32		1		685		0.0		16.4		0.5		129		75	
10407		72		18		1		347		0.0		17.5		0.5		134		56
10408		77		18		2		377		0.0		19.0		0.5		120		61
10409		83		24		1		418		0.0		15.1		0.5		150		53
10410		60		25		0		338		0.0		15.4		0.5		157		70
10411		71		23		1		354		0.0		17.7		0.5		143		51
10412		71		23		1		398		0.0		13.1		0.5		127		47

Animal Number	Triglyceride mg/dl Week 5	Triglyceride mg/dl Week 7	Total Protein g/dl Week 5	Total Protein g/dl Week 7	Albumin g/dl Week 5	Albumin g/dl Week 7	A/G Ratio Week 5	A/G Ratio Week 7	Calcium mg/dl Week 5	Calcium mg/dl Week 7	Inorganic Phosphorus mg/dl Week 5	Inorganic Phosphorus mg/dl Week 7	Na mmol/l Week 5	Na mmol/l Week 7	K mmol/l Week 5	K mmol/l Week 7	Cl mmol/l Week 5	Cl mmol/l Week 7
10401	11		6.6		3.4		1.06		9.5		7.6		145		4.0		101	
10402	17		6.6		3.4		1.06		9.6		8.1		144		4.5		102	
10403	29		7.0		3.6		1.06		9.4		8.3		144		4.2		101	
10404	63		7.1		3.6		1.03		10.0		8.5		144		4.3		101	
10405	36		7.2		3.6		1.00		9.7		8.6		144		4.5		100	
10406	30		6.7		3.3		0.97		9.6		8.2		143		4.8		99	
10407		31		7.7		3.6		0.88		9.9		8.5		144		4.3		98
10408		47		7.3		3.5		0.92		10.0		8.2		143		4.7		100
10409		53		6.7		3.5		1.09		9.8		7.5		142		4.2		98
10410		89		7.2		3.6		1.00		10.1		7.9		142		4.4		100
10411		51		7.2		3.6		1.00		9.7		7.9		142		4.8		100
10412		35		6.6		3.4		1.06		9.6		8.2		143		4.5		102

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 10- 5 Blood Chemistry ZnS 0 mg/kg Female

Animal Number	ASAT(GOT) U/l Week 5	Week 7	ALAT(GPT) U/l Week 5	Week 7	γGT U/l Week 5	Week 7	ALP U/l Week 5	Week 7	Total Bilirubin mg/dl Week 5	Week 7	Urea Nitrogen mg/dl Week 5	Week 7	Creatinine mg/dl Week 5	Week 7	Glucose mg/dl Week 5	Week 7	Total Cholesterol mg/dl Week 5	Week 7
50101	62		18		1		428		0.0		14.0		0.5		118		56	
50102	82		14		2		263		0.0		14.5		0.4		111		58	
50103	97		20		1		343		0.0		13.5		0.6		125		91	
50104	63		13		1		282		0.0		13.6		0.4		113		81	
50105	70		21		1		254		0.0		13.8		0.5		132		84	
50106	92		40		2		377		0.0		17.8		0.5		111		68	
50107		98		21		1		332		0.0		17.7		0.5		94		72
50108		85		20		1		171		0.0		19.1		0.5		127		59
50109		84		19		2		277		0.0		16.2		0.5		143		64
50110		73		17		1		314		0.0		20.3		0.6		104		59
50111		80		17		1		348		0.0		16.2		0.6		122		83
50112		81		23		1		393		0.0		13.0		0.5		146		73

Animal Number	Triglyceride mg/dl Week 5	Week 7	Total Protein g/dl Week 5	Week 7	Albumin g/dl Week 5	Week 7	A/G Ratio Week 5	Week 7	Calcium mg/dl Week 5	Week 7	Inorganic Phosphorus mg/dl Week 5	Week 7	Na mmol/l Week 5	Week 7	K mmol/l Week 5	Week 7	Cl mmol/l Week 5	Week 7
50101	31		6.3		3.3		1.10		9.4		8.1		144		4.9		102	
50102	15		6.9		3.8		1.23		9.7		8.3		143		4.4		100	
50103	16		7.1		3.7		1.09		9.2		7.7		142		4.4		101	
50104	9		6.5		3.6		1.24		9.4		7.3		145		4.2		102	
50105	23		6.4		3.5		1.21		9.2		7.1		142		4.1		102	
50106	9		6.8		3.7		1.19		9.1		6.3		146		3.4		106	
50107		11		6.9		3.6		1.09		9.7		8.4		142		4.8		101
50108		12		6.9		3.5		1.03		9.5		6.9		143		4.3		103
50109		12		7.0		3.6		1.06		9.4		6.9		143		4.0		104
50110		14		6.4		3.4		1.13		9.4		7.4		143		4.1		103
50111		11		7.2		3.8		1.12		9.6		7.1		142		4.3		100
50112		13		6.7		3.4		1.03		9.5		7.7		143		4.2		102

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 10- 6 Blood Chemistry ZnS 40 mg/kg Female

Animal Number	ASAT(GOT) U/l Week 5	Week 7	ALAT(GPT) U/l Week 5	Week 7	γGT U/l Week 5	Week 7	ALP U/l Week 5	Week 7	Total Bilirubin mg/dl Week 5	Week 7	Urea Nitrogen mg/dl Week 5	Week 7	Creatinine mg/dl Week 5	Week 7	Glucose mg/dl Week 5	Week 7	Total Cholesterol mg/dl Week 5	Week 7
50201	77		20		1		210		0.0		15.9		0.4		98		78	
50202	72		19		1		191		0.0		11.3		0.5		128		74	
50203	98		18		1		403		0.0		14.0		0.5		100		72	
50204	69		17		1		341		0.0		10.9		0.5		115		54	
50205	89		19		2		398		0.0		15.3		0.3		113		71	
50206	75		17		1		323		0.0		12.5		0.5		108		100	

Animal Number	Triglyceride mg/dl Week 5	Week 7	Total Protein g/dl Week 5	Week 7	Albumin g/dl Week 5	Week 7	A/G Ratio Week 5	Week 7	Calcium mg/dl Week 5	Week 7	Inorganic Phosphorus mg/dl Week 5	Week 7	Na mmol/l Week 5	Week 7	K mmol/l Week 5	Week 7	Cl mmol/l Week 5	Week 7
50201	19		6.2		3.2		1.07		9.3		8.4		143		4.4		104	
50202	11		6.6		3.6		1.20		9.5		7.3		142		4.3		100	
50203	7		6.2		3.4		1.21		8.7		7.1		144		4.2		104	
50204	22		6.2		3.4		1.21		9.2		7.8		143		4.3		101	
50205	9		6.7		3.5		1.09		9.5		7.6		142		4.5		101	
50206	7		6.8		3.5		1.06		9.6		7.6		145		4.8		102	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 10- 7 Blood Chemistry ZnS 200 mg/kg Female

Animal Number	ASAT(GOT) U/l Week 5	ASAT(GOT) U/l Week 7	ALAT(GPT) U/l Week 5	ALAT(GPT) U/l Week 7	γGT U/l Week 5	γGT U/l Week 7	ALP U/l Week 5	ALP U/l Week 7	Total Bilirubin mg/dl Week 5	Total Bilirubin mg/dl Week 7	Urea Nitrogen mg/dl Week 5	Urea Nitrogen mg/dl Week 7	Creatinine mg/dl Week 5	Creatinine mg/dl Week 7	Glucose mg/dl Week 5	Glucose mg/dl Week 7	Total Cholesterol mg/dl Week 5	Total Cholesterol mg/dl Week 7
50301	75		23		1		348		0.0		17.8		0.6		112		53	
50302	120		16		2		448		0.0		11.3		0.5		117		64	
50303	98		24		2		377		0.0		14.7		0.5		118		62	
50304	57		17		1		290		0.0		15.1		0.5		103		93	
50305	75		19		2		409		0.0		15.0		0.6		108		66	
50306	88		12		1		287		0.0		14.7		0.5		104		43	

Animal Number	Triglyceride mg/dl Week 5	Triglyceride mg/dl Week 7	Total Protein g/dl Week 5	Total Protein g/dl Week 7	Albumin g/dl Week 5	Albumin g/dl Week 7	A/G Ratio Week 5	A/G Ratio Week 7	Calcium mg/dl Week 5	Calcium mg/dl Week 7	Inorganic Phosphorus mg/dl Week 5	Inorganic Phosphorus mg/dl Week 7	Na mmol/l Week 5	Na mmol/l Week 7	K mmol/l Week 5	K mmol/l Week 7	Cl mmol/l Week 5	Cl mmol/l Week 7
50301	13		7.2		3.7		1.06		10.6		11.0		142		8.8		102	
50302	10		6.7		3.4		1.03		9.2		7.8		141		4.5		101	
50303	8		6.6		3.4		1.06		9.4		7.6		144		4.1		102	
50304	15		7.2		3.8		1.12		10.2		7.8		145		4.0		101	
50305	8		6.4		3.4		1.13		8.7		6.6		144		3.7		105	
50306	7		6.1		3.2		1.10		9.2		7.5		146		4.1		103	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 10- 8 Blood Chemistry ZnS 1000 mg/kg Female

Study No. B000875

Animal Number	ASAT(GOT) U/l Week 5	ASAT(GOT) U/l Week 7	ALAT(GPT) U/l Week 5	ALAT(GPT) U/l Week 7	γGT U/l Week 5	γGT U/l Week 7	ALP U/l Week 5	ALP U/l Week 7	Total Bilirubin mg/dl Week 5	Total Bilirubin mg/dl Week 7	Urea Nitrogen mg/dl Week 5	Urea Nitrogen mg/dl Week 7	Creatinine mg/dl Week 5	Creatinine mg/dl Week 7	Glucose mg/dl Week 5	Glucose mg/dl Week 7	Total Cholesterol mg/dl Week 5	Total Cholesterol mg/dl Week 7
50401	70		14		1		268		0.0		14.0		0.4		127		46	
50402	66		21		1		519		0.0		14.0		0.4		125		64	
50403	77		17		2		258		0.0		16.0		0.5		97		47	
50404	60		17		1		278		0.0		15.2		0.5		122		68	
50405	57		14		1		178		0.0		14.3		0.5		126		67	
50406	79		15		1		310		0.0		13.4		0.5		113		78	
50407		77		27		1		185		0.0		19.9		0.5		141		87
50408		77		15		1		185		0.0		12.8		0.5		127		77
50409		67		18		1		185		0.0		16.9		0.4		130		85
50410		67		19		1		223		0.0		14.3		0.5		108		66
50411		75		24		1		453		0.0		17.1		0.5		134		93
50412		73		19		1		178		0.0		17.2		0.5		117		73

Animal Number	Triglyceride mg/dl Week 5	Triglyceride mg/dl Week 7	Total Protein g/dl Week 5	Total Protein g/dl Week 7	Albumin g/dl Week 5	Albumin g/dl Week 7	A/G Ratio Week 5	A/G Ratio Week 7	Calcium mg/dl Week 5	Calcium mg/dl Week 7	Inorganic Phosphorus mg/dl Week 5	Inorganic Phosphorus mg/dl Week 7	Na mmol/l Week 5	Na mmol/l Week 7	K mmol/l Week 5	K mmol/l Week 7	Cl mmol/l Week 5	Cl mmol/l Week 7
50401	8		6.2		3.3		1.14		9.1		7.1		140		4.4		102	
50402	11		6.5		3.4		1.10		9.7		7.5		143		4.3		100	
50403	5		6.2		3.4		1.21		8.8		6.8		142		3.9		104	
50404	10		6.6		3.4		1.06		9.7		7.5		143		4.2		102	
50405	8		6.4		3.5		1.21		9.0		5.9		144		4.1		105	
50406	8		6.5		3.4		1.10		9.1		7.5		143		4.2		104	
50407		19		7.3		3.9		1.15		9.9		7.5		143		4.0		103
50408		10		7.1		3.7		1.09		9.7		6.7		143		4.1		103
50409		13		6.8		3.6		1.13		9.4		6.9		142		4.2		103
50410		10		7.0		3.6		1.06		9.7		6.6		143		4.3		103
50411		19		6.9		3.6		1.09		9.4		7.6		142		4.6		101
50412		11		6.3		3.4		1.17		9.0		6.4		145		3.8		106

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Study No. B000875

Appendix II- 1 Urinalysis ZnS 0 mg/kg Male

Animal Number	pH		Protein		Glucose		Ketones		Bilirubin		Occult Blood		Urobilinogen EU/dl	
	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6
10101	>=9.0		1+		-		+/-		-		-		0.1	
10102	6.0		+/-		-		+/-		-		-		0.1	
10103	8.5		1+		-		+/-		-		-		0.1	
10104	8.5		1+		-		+/-		-		-		0.1	
10105	8.0		+/-		-		+/-		-		-		0.1	
10106	8.5		+/-		-		+/-		-		-		0.1	
10107		8.5		1+		-		1+		-		-		0.1
10108		8.0		1+		-		1+		-		-		0.1
10109		8.0		1+		-		1+		-		-		0.1
10110		8.0		1+		-		1+		-		-		0.1
10111		8.0		1+		-		+/-		-		-		0.1
10112		8.5		1+		-		1+		-		1+		0.1

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 11- 2 Urinalysis ZnS 40 mg/kg Male

Study No. B000875

Animal Number	pH		Protein		Glucose		Ketones		Bilirubin		Occult Blood		Urobilinogen EU/dl	
	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6
10201	8.5		-		-		-		-		-		0.1	
10202	8.5		1+		-		+/-		-		-		0.1	
10203	8.5		1+		-		+/-		-		-		0.1	
10204	8.5		1+		-		1+		-		3+		1.0	
10205	8.0		2+		-		1+		-		-		1.0	
10206	8.5		+/-		-		+/-		-		-		0.1	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix 11- 3 Urinalysis ZnS 200 mg/kg Male

Study No. B000875

Animal Number	pH		Protein		Glucose		Ketones		Bilirubin		Occult Blood		Urobilinogen EU/dl	
	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6
10301	8.0		2+		-		1+		-		-		1.0	
10302	8.5		1+		-		+/-		-		-		0.1	
10303	8.5		2+		-		1+		-		-		0.1	
10304	8.5		2+		-		1+		-		-		0.1	
10305	8.0		1+		-		1+		-		-		0.1	
10306	>=9.0		2+		-		1+		-		-		1.0	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Study No. B000875

Appendix 11- 4 Urinalysis ZnS 1000 mg/kg Male

Animal Number	pH		Protein		Glucose		Ketones		Bilirubin		Occult Blood		Urobilinogen EU/dl	
	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6
10401	8.0		1+		-		+/-		-		-		0.1	
10402	8.0		1+		-		+/-		-		-		0.1	
10403	8.0		2+		-		1+		-		-		1.0	
10404	8.0		1+		-		1+		-		1+		0.1	
10405	8.5		2+		-		1+		-		-		0.1	
10406	8.0		1+		-		+/-		-		-		1.0	
10407		8.5		2+		-		1+		-		-		0.1
10408		8.5		1+		-		1+		-		-		0.1
10409		8.5		1+		-		1+		-		-		0.1
10410		8.5		+/-		-		+/-		-		-		0.1
10411		8.0		1+		-		1+		-		-		0.1
10412		8.5		1+		-		1+		-		-		0.1

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Study No. B000875

Appendix II- 5 Urinalysis ZnS 0 mg/kg Female

Animal Number	pH		Protein		Glucose		Ketones		Bilirubin		Occult Blood		Urobilinogen EU/dl	
	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6
50101	8.0		-		-		-		-		-		0.1	
50102	6.5		-		-		+/-		-		-		0.1	
50103	8.0		+/-		-		+/-		-		-		0.1	
50104	8.5		1+		-		+/-		-		-		0.1	
50105	8.5		1+		-		1+		-		-		1.0	
50106	8.5		-		-		-		-		-		0.1	
50107		8.0		+/-		-		+/-		-		-		0.1
50108		8.0		+/-		-		-		-		+/-		0.1
50109		8.0		-		-		-		-		-		0.1
50110		7.0		-		-		-		-		-		0.1
50111		8.5		-		-		+/-		-		-		0.1
50112		8.0		-		-		-		-		-		0.1

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Study No. B000875

Appendix II- 6 Urinalysis ZnS 40 mg/kg Female

Animal Number	pH		Protein		Glucose		Ketones		Bilirubin		Occult Blood		Urobilinogen EU/dl	
	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6
50201	8.0		1+		-		+/-		-		-		1.0	
50202	8.5		+/-		-		-		-		-		0.1	
50203	8.5		-		-		-		-		-		0.1	
50204	8.5		1+		-		+/-		-		-		1.0	
50205	8.0		1+		-		+/-		-		-		1.0	
50206	8.5		1+		-		+/-		-		-		1.0	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Appendix II- 7 Urinalysis ZnS 200 mg/kg Female

Study No. B000875

Animal Number	pH		Protein		Glucose		Ketones		Bilirubin		Occult Blood		Urobilinogen EU/dl	
	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6
50301	8.5		-		-		-		-		-		0.1	
50302	8.5		+/-		-		+/-		-		-		0.1	
50303	8.5		+/-		-		+/-		-		-		0.1	
50304	8.5		+/-		-		+/-		-		-		0.1	
50305	8.5		-		-		+/-		-		-		0.1	
50306	8.0		++		-		+/-		-		-		1.0	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 11- 8 Urinalysis — ZnS — 1000 mg/kg — Female

Animal Number	pH		Protein		Glucose		Ketones		Bilirubin		Occult Blood		Urobilinogen EU/dl	
	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6	Week 4	Week 6
50401	8.5		1+		-		+/-		-		-		0.1	
50402	8.0		+/-		-		+/-		-		-		0.1	
50403	7.5		1+		-		+/-		-		-		1.0	
50404	8.0		-		-		-		-		-		0.1	
50405	8.0		1+		-		+/-		-		-		1.0	
50406	8.0		-		-		-		-		-		0.1	
50407		8.0		-		-		-		-		-		0.1
50408		8.5		+/-		-		+/-		-		-		0.1
50409		8.0		-		-		-		-		-		0.1
50410		8.0		+/-		-		+/-		-		-		0.1
50411		8.0		+/-		-		+/-		-		-		0.1
50412		8.5		-		-		-		-		-		0.1

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 12- 1 Organ Weight ZnS 0 mg/kg Male

Animal Number	Final Body Weight g Week 5	Final Body Weight g Week 7	Brain g Week 5	Brain g Week 7	Thymus mg Week 5	Thymus mg Week 7	Heart g Week 5	Heart g Week 7	Liver g Week 5	Liver g Week 7	Spleen g Week 5	Spleen g Week 7	Kidneys g Week 5	Kidneys g Week 7	Adrenals mg Week 5	Adrenals mg Week 7	Testes g Week 5	Testes g Week 7
10101	356		1.95		444		1.22		10.88		0.53		2.47		62.1		2.98	
10102	334		1.95		535		1.30		10.90		0.67		2.60		58.3		2.89	
10103	403		2.06		817		1.36		11.27		0.88		3.09		58.6		3.20	
10104	381		1.87		713		1.29		11.45		0.69		2.93		51.5		3.24	
10105	359		2.01		627		1.34		10.72		0.72		2.69		48.8		3.28	
10106	413		2.00		604		1.30		11.63		0.80		3.01		51.9		3.17	
10107		446		2.11		525		1.74		13.48		0.91		3.23		63.1		3.48
10108		515		2.08		560		1.58		13.77		0.88		3.25		75.0		3.54
10109		526		2.29		764		1.57		16.24		0.87		3.78		72.5		3.71
10110		385		1.85		416		1.48		11.57		0.68		2.79		64.9		2.79
10111		453		2.02		679		1.74		14.14		0.92		2.85		70.8		3.40
10112		410		2.08		569		1.29		11.70		0.70		2.83		51.2		3.56

Animal Number	Epididymides g Week 5	Epididymides g Week 7
10101	1.10	
10102	0.85	
10103	0.98	
10104	0.96	
10105	0.91	
10106	0.87	
10107		1.26
10108		1.29
10109		1.18
10110		1.03
10111		1.23
10112		1.20

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 12- 2 Organ Weight ZnS 40 mg/kg Male

Animal Number	Final Body Weight g Week 5	Week 7	Brain g Week 5	Week 7	Thymus mg Week 5	Week 7	Heart g Week 5	Week 7	Liver g Week 5	Week 7	Spleen g Week 5	Week 7	Kidneys g Week 5	Week 7	Adrenals mg Week 5	Week 7	Testes g Week 5	Week 7
10201	378		1.93		592		1.30		12.48		0.83		2.64		57.7		0.70	
10202	404		2.14		631		1.41		12.19		0.84		2.92		52.7		3.03	
10203	374		2.00		633		1.37		10.65		0.70		2.42		40.5		3.18	
10204	382		2.10		790		1.45		10.48		0.81		2.51		63.9		2.88	
10205	397		2.06		856		1.40		12.33		0.73		2.98		64.9		3.46	
10206	354		1.98		551		1.38		10.72		0.62		2.68		57.6		3.11	

Animal Number	Epididymides g Week 5	Week 7
10201	0.45	
10202	0.84	
10203	0.88	
10204	0.82	
10205	0.92	
10206	0.92	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 12- 3 Organ Weight — ZnS — 200 mg/kg — Male

Animal Number	Final Body Weight g Week 5	Final Body Weight g Week 7	Brain g Week 5	Brain g Week 7	Thymus mg Week 5	Thymus mg Week 7	Heart g Week 5	Heart g Week 7	Liver g Week 5	Liver g Week 7	Spleen g Week 5	Spleen g Week 7	Kidneys g Week 5	Kidneys g Week 7	Adrenals mg Week 5	Adrenals mg Week 7	Testes g Week 5	Testes g Week 7
10301	396		2.18		729		1.69		12.12		1.11		3.04		71.6		3.41	
10302	350		2.12		643		1.40		10.19		0.74		2.38		53.0		2.90	
10303	390		2.09		742		1.39		12.23		0.95		3.06		63.2		3.08	
10304	361		2.02		794		1.21		10.69		0.99		2.54		63.3		3.51	
10305	341		1.96		427		1.19		10.20		0.54		2.79		67.1		3.11	
10306	330		1.90		353		1.15		10.58		0.55		2.48		66.2		3.02	

Animal Number	Epididymides g Week 5	Epididymides g Week 7
10301	1.19	
10302	0.82	
10303	0.92	
10304	0.93	
10305	0.81	
10306	0.78	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 12- 4 Organ Weight — ZnS — 1000 mg/kg — Male

Animal Number	Final Body Weight g Week 5	Final Body Weight g Week 7	Brain g Week 5	Brain g Week 7	Thymus mg Week 5	Thymus mg Week 7	Heart g Week 5	Heart g Week 7	Liver g Week 5	Liver g Week 7	Spleen g Week 5	Spleen g Week 7	Kidneys g Week 5	Kidneys g Week 7	Adrenals mg Week 5	Adrenals mg Week 7	Testes g Week 5	Testes g Week 7
10401	345		2.10		554		1.29		10.57		0.82		2.60		63.4		3.16	
10402	356		2.13		687		1.38		10.78		0.74		2.52		58.8		3.16	
10403	382		2.01		645		1.45		12.20		0.70		2.80		68.2		3.22	
10404	389		2.05		804		1.57		12.43		0.86		2.92		54.5		3.49	
10405	344		2.01		568		1.27		11.42		0.73		2.49		58.5		2.93	
10406	380		2.09		602		1.45		10.71		0.90		2.78		74.5		3.33	
10407		453		2.09		581		1.43		13.11		0.77		3.12		69.7		3.33
10408		445		2.06		591		1.38		13.73		0.90		2.79		67.0		3.19
10409		451		2.16		573		1.46		12.96		1.06		3.17		82.9		3.29
10410		464		2.11		605		1.41		15.29		0.60		3.22		56.9		2.92
10411		438		1.89		381		1.40		13.94		0.72		2.98		85.5		3.26
10412		455		2.07		450		1.57		13.10		0.78		3.27		69.3		3.50

Animal Number	Epididymides g Week 5	Epididymides g Week 7
10401	0.82	
10402	0.77	
10403	0.81	
10404	0.98	
10405	0.90	
10406	0.89	
10407		1.44
10408		1.19
10409		1.35
10410		1.13
10411		1.20
10412		1.38

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. BD00875

Appendix 12- 5 Organ Weight ZnS 0 mg/kg Female

Animal Number	Final Body Weight g Week 5	Final Body Weight g Week 7	Brain g Week 5	Brain g Week 7	Thymus mg Week 5	Thymus mg Week 7	Heart g Week 5	Heart g Week 7	Liver g Week 5	Liver g Week 7	Spleen g Week 5	Spleen g Week 7	Kidneys g Week 5	Kidneys g Week 7	Adrenals mg Week 5	Adrenals mg Week 7	Ovaries mg Week 5	Ovaries mg Week 7
50101	231		1.78		477		0.79		6.26		0.46		1.72		72.0		86.7	
50102	234		1.93		513		1.00		7.15		0.50		1.76		60.5		90.2	
50103	239		1.77		588		0.82		7.24		0.54		1.57		67.4		87.7	
50104	228		1.97		544		0.89		6.65		0.38		1.62		61.9		90.7	
50105	221		1.73		276		0.78		6.37		0.40		1.50		66.0		94.3	
50106	207		1.81		292		0.85		6.25		0.49		1.60		56.8		69.4	
50107		227		1.87		444		0.86		5.79		0.45		1.69		62.3		84.7
50108		245		1.87		466		0.82		6.71		0.49		1.75		74.1		91.9
50109		257		1.88		441		0.91		7.34		0.45		1.73		78.7		84.8
50110		238		1.79		324		0.81		6.14		0.49		1.64		71.5		87.7
50111		230		1.99		327		0.97		6.50		0.54		1.85		62.3		94.7
50112		279		2.03		484		0.86		7.15		0.47		1.74		94.6		101.3

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 12- 6 Organ Weight — ZnS — 40 mg/kg — Female

Animal Number	Final Body Weight g		Brain g		Thymus mg		Heart g		Liver g		Spleen g		Kidneys g		Adrenals mg		Ovaries mg	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
50201	227		1.91		527		0.85		6.90		0.56		1.57		63.5		100.9	
50202	222		1.78		392		0.81		6.34		0.46		1.58		67.9		75.5	
50203	209		1.75		501		0.83		5.75		0.36		1.47		65.8		66.9	
50204	208		1.82		494		0.74		5.99		0.45		1.52		63.2		78.1	
50205	245		1.93		495		0.98		6.69		0.64		1.59		61.7		75.0	
50206	223		1.78		452		0.78		6.43		0.42		1.58		62.2		103.6	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 12- 7 Organ Weight ZnS 200 mg/kg Female

Animal Number	Final Body Weight g Week 5	Week 7	Brain g Week 5	Week 7	Thymus mg Week 5	Week 7	Heart g Week 5	Week 7	Liver g Week 5	Week 7	Spleen g Week 5	Week 7	Kidneys g Week 5	Week 7	Adrenals mg Week 5	Week 7	Ovaries mg Week 5	Week 7
50301	180		1.82		436		0.67		5.08		0.42		1.36		55.7		69.4	
50302	229		1.90		775		0.82		7.41		0.66		1.66		76.6		99.3	
50303	192		1.88		493		0.77		5.47		0.51		1.47		65.9		73.9	
50304	222		1.88		393		0.84		6.69		0.48		1.51		55.3		96.2	
50305	229		1.90		631		0.81		6.76		0.53		1.70		62.3		82.6	
50306	227		1.92		608		0.82		5.93		0.48		1.67		67.2		83.8	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. BD00875

Appendix 12- 8 Organ Weight — ZnS — 1000 mg/kg — Female

Animal Number	Final Body Weight g Week 5	Final Body Weight g Week 7	Brain g Week 5	Brain g Week 7	Thymus mg Week 5	Thymus mg Week 7	Heart g Week 5	Heart g Week 7	Liver g Week 5	Liver g Week 7	Spleen g Week 5	Spleen g Week 7	Kidneys g Week 5	Kidneys g Week 7	Adrenals mg Week 5	Adrenals mg Week 7	Ovaries mg Week 5	Ovaries mg Week 7
50401	229		1.72		555		0.85		6.53		0.58		1.60		56.9		97.1	
50402	212		1.89		447		0.76		5.81		0.54		1.72		61.0		110.9	
50403	201		1.95		305		0.79		5.79		0.55		1.50		56.4		85.1	
50404	235		1.89		433		0.98		6.56		0.59		1.87		63.6		98.2	
50405	218		1.87		305		0.79		6.40		0.46		1.65		59.5		77.5	
50406	196		1.73		403		0.74		5.34		0.44		1.55		45.6		97.2	
50407		272		1.92		440		0.93		7.97		0.57		1.93		69.0		90.4
50408		270		1.88		483		0.95		8.06		0.77		1.82		62.9		134.5
50409		261		1.91		471		1.04		6.94		0.58		1.80		74.0		99.2
50410		248		1.90		501		0.84		6.59		0.56		1.70		79.6		90.0
50411		257		1.88		405		0.89		7.47		0.54		1.78		69.3		87.6
50412		244		1.90		453		0.89		6.88		0.65		1.68		71.3		110.6

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. D000875

Appendix 13- 1 Relative Organ Weight — ZnS — 0 mg/kg — Male

Animal Number	Final Body Weight g Week 5	Final Body Weight g Week 7	Brain % Week 5	Brain % Week 7	Thymus x10⁻³% Week 5	Thymus x10⁻³% Week 7	Heart % Week 5	Heart % Week 7	Liver % Week 5	Liver % Week 7	Spleen % Week 5	Spleen % Week 7	Kidneys % Week 5	Kidneys % Week 7	Adrenals x10⁻³% Week 5	Adrenals x10⁻³% Week 7	Testes % Week 5	Testes % Week 7
10101	356		0.55		124.7		0.34		3.06		0.15		0.69		17.4		0.84	
10102	334		0.58		160.2		0.39		3.26		0.20		0.78		17.5		0.87	
10103	403		0.51		202.7		0.34		2.80		0.22		0.77		14.5		0.79	
10104	381		0.49		187.1		0.34		3.01		0.18		0.77		13.5		0.85	
10105	359		0.56		174.7		0.37		2.99		0.20		0.75		13.6		0.91	
10106	413		0.48		146.2		0.31		2.82		0.19		0.73		12.6		0.77	
10107		446		0.47		117.7		0.39		3.02		0.20		0.72		14.1		0.78
10108		515		0.40		108.7		0.31		2.67		0.17		0.63		14.6		0.69
10109		526		0.44		145.2		0.30		3.09		0.17		0.72		13.8		0.71
10110		385		0.48		108.1		0.38		3.01		0.18		0.72		16.9		0.72
10111		453		0.45		149.9		0.38		3.12		0.20		0.63		15.6		0.75
10112		410		0.51		138.8		0.31		2.85		0.17		0.69		12.5		0.87

Animal Number	Epididymides % Week 5	Epididymides % Week 7
10101	0.31	
10102	0.25	
10103	0.24	
10104	0.25	
10105	0.25	
10106	0.21	
10107		0.28
10108		0.25
10109		0.22
10110		0.27
10111		0.27
10112		0.29

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 13- 2 Relative Organ Weight — ZnS — 40 mg/kg — Male

Animal Number	Final Body Weight g		Brain %		Thymus x10⁻³%		Heart %		Liver %		Spleen %		Kidneys %		Adrenals x10⁻³%		Testes %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
10201	378		0.51		156.6		0.34		3.30		0.22		0.70		15.3		0.19	
10202	404		0.53		156.2		0.35		3.02		0.21		0.72		13.0		0.75	
10203	374		0.53		169.3		0.37		2.85		0.19		0.65		10.8		0.85	
10204	382		0.55		206.8		0.38		2.74		0.21		0.66		16.7		0.75	
10205	397		0.52		215.6		0.35		3.11		0.18		0.75		16.3		0.87	
10206	354		0.56		155.6		0.39		3.03		0.18		0.76		16.3		0.88	

Animal Number	Epididymides %	
	Week 5	Week 7
10201	0.12	
10202	0.21	
10203	0.24	
10204	0.21	
10205	0.23	
10206	0.26	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats
Study No. B000875

Appendix 13- 3 Relative Organ Weight ZnS 200 mg/kg Male

Animal Number	Final Body Weight g Week 5	Final Body Weight g Week 7	Brain % Week 5	Brain % Week 7	Thymus x10⁻³% Week 5	Thymus x10⁻³% Week 7	Heart % Week 5	Heart % Week 7	Liver % Week 5	Liver % Week 7	Spleen % Week 5	Spleen % Week 7	Kidneys % Week 5	Kidneys % Week 7	Adrenals x10⁻³% Week 5	Adrenals x10⁻³% Week 7	Testes % Week 5	Testes % Week 7
10301	396		0.55		184.1		0.43		3.06		0.28		0.77		18.1		0.86	
10302	350		0.61		183.7		0.40		2.91		0.21		0.68		15.1		0.83	
10303	390		0.54		190.3		0.36		3.14		0.24		0.78		16.2		0.79	
10304	361		0.56		219.9		0.34		2.96		0.27		0.70		17.5		0.97	
10305	341		0.57		125.2		0.35		2.99		0.16		0.82		19.7		0.91	
10306	330		0.58		107.0		0..35		3.21		0.17		0.75		20.1		0.92	

Animal Number	Epididymides % Week 5	Epididymides % Week 7
10301	0.30	
10302	0.23	
10303	0.24	
10304	0.26	
10305	0.24	
10306	0.24	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 13- 4 Relative Organ Weight — ZnS — 1000 mg/kg — Male

Animal Number	Final Body Weight g		Brain %		Thymus x10⁻³%		Heart %		Liver %		Spleen %		Kidneys %		Adrenals x10⁻³%		Testes %	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
10401	345		0.61		160.6		0.37		3.06		0.24		0.75		18.4		0.92	
10402	356		0.60		193.0		0.39		3.03		0.21		0.71		16.5		0.89	
10403	382		0.53		168.8		0.38		3.19		0.18		0.73		17.9		0.84	
10404	389		0.53		206.7		0.40		3.20		0.22		0.75		14.0		0.90	
10405	344		0.58		165.1		0.37		3.32		0.21		0.72		17.0		0.85	
10406	380		0.55		158.4		0.38		2.82		0.24		0.73		19.6		0.88	
10407		453		0.46		128.3		0.32		2.89		0.17		0.69		15.4		0.74
10408		445		0.46		132.8		0.31		3.09		0.20		0.63		15.1		0.72
10409		451		0.48		127.1		0.32		2.87		0.24		0.70		18.4		0.73
10410		464		0.45		130.4		0.30		3.30		0.13		0.69		12.3		0.63
10411		438		0.43		87.0		0.32		3.18		0.16		0.68		19.5		0.74
10412		455		0.45		98.9		0.35		2.88		0.17		0.72		15.2		0.77

Animal Number	Epididymides %	
	Week 5	Week 7
10401	0.24	
10402	0.22	
10403	0.21	
10404	0.25	
10405	0.26	
10406	0.23	
10407		0.32
10408		0.27
10409		0.30
10410		0.24
10411		0.27
10412		0.30

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 13- 5 Relative Organ Weight ZnS 0 mg/kg Female

Animal Number	Final Body Weight g Week 5	Final Body Weight g Week 7	Brain % Week 5	Brain % Week 7	Thymus x10⁻³% Week 5	Thymus x10⁻³% Week 7	Heart % Week 5	Heart % Week 7	Liver % Week 5	Liver % Week 7	Spleen % Week 5	Spleen % Week 7	Kidneys % Week 5	Kidneys % Week 7	Adrenals x10⁻³% Week 5	Adrenals x10⁻³% Week 7	Ovaries x10⁻³% Week 5	Ovaries x10⁻³% Week 7
50101	231		0.77		206.5		0.34		2.71		0.20		0.74		31.2		37.5	
50102	234		0.82		219.2		0.43		3.06		0.21		0.75		25.9		38.5	
50103	239		0.74		246.0		0.34		3.03		0.23		0.66		28.2		36.7	
50104	228		0.86		238.6		0.39		2.92		0.17		0.71		27.1		39.8	
50105	221		0.78		124.9		0.35		2.88		0.18		0.68		29.9		42.7	
50106	207		0.87		141.1		0.41		3.02		0.24		0.77		27.4		33.5	
50107		227		0.82		195.6		0.38		2.55		0.20		0.74		27.4		37.3
50108		245		0.76		190.2		0.33		2.74		0.20		0.71		30.2		37.5
50109		257		0.73		171.6		0.35		2.86		0.18		0.67		30.6		33.0
50110		238		0.75		136.1		0.34		2.58		0.21		0.69		30.0		36.8
50111		230		0.87		142.2		0.42		2.83		0.23		0.80		27.1		41.2
50112		279		0.73		173.5		0.31		2.56		0.17		0.62		33.9		36.3

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 13- 6 Relative Organ Weight — ZnS — 40 mg/kg — Female

Animal Number	Final Body Weight g		Brain %		Thymus x10⁻³%		Heart %		Liver %		Spleen %		Kidneys %		Adrenals x10⁻³%		Ovaries x10⁻³%	
	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7	Week 5	Week 7
50201	227		0.84		232.2		0.37		3.04		0.25		0.69		28.0		44.4	
50202	222		0.80		176.6		0.36		2.86		0.21		0.71		30.6		34.0	
50203	209		0.84		239.7		0.40		2.75		0.17		0.70		31.5		32.0	
50204	208		0.88		237.5		0.36		2.88		0.22		0.73		30.4		37.5	
50205	245		0.79		202.0		0.40		2.73		0.26		0.65		25.2		30.6	
50206	223		0.80		202.7		0.35		2.88		0.19		0.71		27.9		46.5	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 13- 7 Relative Organ Weight ZnS 200 mg/kg Female

Animal Number	Final Body Weight g Week 5	Week 7	Brain % Week 5	Week 7	Thymus $\times10^{-3}$% Week 5	Week 7	Heart % Week 5	Week 7	Liver % Week 5	Week 7	Spleen % Week 5	Week 7	Kidneys % Week 5	Week 7	Adrenals $\times10^{-3}$% Week 5	Week 7	Ovaries $\times10^{-3}$% Week 5	Week 7
50301	180		1.01		242.2		0.37		2.82		0.23		0.76		30.9		38.6	
50302	229		0.83		338.4		0.36		3.24		0.29		0.72		33.4		43.4	
50303	192		0.98		256.8		0.40		2.85		0.27		0.77		34.3		38.5	
50304	222		0.85		177.0		0.38		3.01		0.22		0.68		24.9		43.3	
50305	229		0.83		275.5		0.35		2.95		0.23		0.74		27.2		36.1	
50306	227		0.85		267.8		0.36		2.61		0.21		0.74		29.6		36.9	

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats

Study No. B000875

Appendix 13- 8 Relative Organ Weight ZnS 1000 mg/kg Female

Animal Number	Final Body Weight g Week 5	Final Body Weight g Week 7	Brain % Week 5	Brain % Week 7	Thymus x10⁻³% Week 5	Thymus x10⁻³% Week 7	Heart % Week 5	Heart % Week 7	Liver % Week 5	Liver % Week 7	Spleen % Week 5	Spleen % Week 7	Kidneys % Week 5	Kidneys % Week 7	Adrenals x10⁻³% Week 5	Adrenals x10⁻³% Week 7	Ovaries x10⁻³% Week 5	Ovaries x10⁻³% Week 7
50401	229		0.75		242.4		0.37		2.85		0.25		0.70		24.8		42.4	
50402	212		0.89		210.8		0.36		2.74		0.25		0.81		28.8		52.3	
50403	201		0.97		151.7		0.39		2.88		0.27		0.75		28.1		42.3	
50404	235		0.80		184.3		0.42		2.79		0.25		0.80		27.1		41.8	
50405	218		0.86		139.9		0.36		2.94		0.21		0.76		27.3		35.6	
50406	196		0.88		205.6		0.38		2.72		0.22		0.79		23.3		49.6	
50407		272		0.71		161.8		0.34		2.93		0.21		0.71		25.4		33.2
50408		270		0.70		178.9		0.35		2.99		0.29		0.67		23.3		49.8
50409		261		0.73		180.5		0.40		2.66		0.22		0.69		28.4		38.0
50410		248		0.77		202.0		0.34		2.66		0.23		0.69		32.1		36.3
50411		257		0.73		157.6		0.35		2.91		0.21		0.69		27.0		34.1
50412		244		0.78		185.7		0.36		2.82		0.27		0.69		29.2		45.3

Animal No.		Necropsy Findings	Histological Findings
10101	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) Microgranuloma(1) Kidney Basophilic tubule, Bilateral(1) Epididymis Inflammatory cell infiltration, lymphocyte, focal, Unilateral(1) Prostate Inflammatory cell infiltration, focal(2) Thyroid Ultimobranchial remnant, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Testis, Pituitary, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
10102	SS (5W)	N	Kidney Hyaline droplet, tubular epithelium, proximal, Bilateral(1) Epididymis Inflammatory cell infiltration, lymphocyte, focal, Bilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Liver, Urinary bladder, Testis, Prostate, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
10103	SS (5W)	Spleen Accessory spleen	Liver Inflammatory cell infiltration, focal(1) Necrosis, focal(1) Kidney Basophilic tubule, Unilateral(1) Inflammatory cell infiltration, lymphocyte, interstitium, focal, Unilateral(1) Prostate Inflammatory cell infiltration, focal(2) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Testis, Epididymis, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland

SS , Scheduled sacrifice
1 , Slight; 2 , Moderate
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
10104	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) Kidney Basophilic tubule, Unilateral(1) Epididymis Inflammatory cell infiltration, lymphocyte, focal, Bilateral(1) Thyroid Ectopic thymic tissue, Unilateral(1) Adrenal Increase in lipid droplet, fascicular zone, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Testis, Prostate, Pituitary, Parathyroid, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
10105	SS (5W)	N	Spleen Microgranuloma(1) Stomach Inflammatory cell infiltration, glandular stomach, focal(1) Liver Inflammatory cell infiltration, focal(1) Kidney Hyaline droplet, tubular epithelium, proximal, Bilateral(1) Thyroid Ectopic thymic tissue, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Bone marrow (femur), Trachea, Lung, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Testis, Epididymis, Prostate, Pituitary, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland

SS , Scheduled sacrifice
1 , Slight
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
10106	SS (5W)	Skin Loss of hair, local	Liver Necrosis, focal(1) Kidney Basophilic tubule, Unilateral(1) Hyaline droplet, tubular epithelium, proximal, Bilateral(1) Inflammatory cell infiltration, lymphocyte, interstitium, focal, Unilateral(1) Epididymis Inflammatory cell infiltration, lymphocyte, focal, Bilateral(1) Subcutis Inflammatory cell infiltration, focal(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Testis, Prostate, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Skin, Bone (femur), Eyeball, Harderian gland
10107	SS (7W)	N	Not examined
10108	SS (7W)	N	Not examined
10109	SS (7W)	N	Not examined
10110	SS (7W)	N	Not examined
10111	SS (7W)	Kidney Cyst, Unilateral	Kidney Cyst, Unilateral(1) Dilatation, pelvis, Unilateral(1) Hyaline droplet, tubular epithelium, proximal, Bilateral(1)
10112	SS (7W)	N	Not examined

SS : Scheduled sacrifice
1 : Slight
N : Finding absent

Animal No.		Necropsy Findings	Histological Findings
10201	SS (5W)	Testis Small, Bilateral Epididymis Small, Bilateral	Testis Atrophy, seminiferous tubule, diffuse, Bilateral(1) Hyperplasia, interstitial cell, diffuse, Bilateral(1) Epididymis Decrease in sperm, Bilateral(3)
10202	SS (5W)	N	Not examined
10203	SS (5W)	Thyroid Nodule, Unilateral	Thyroid Ectopic thymic tissue, Unilateral(1)
10204	SS (5W)	Skin Crust	Skin Dermatitis, focal(1) Subcutis Inflammatory cell infiltration, focal(1)
10205	SS (5W)	N	Not examined
10206	SS (5W)	N	Not examined

SS , Scheduled sacrifice
1 , Slight; 3 , Severe
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
10301	SS (5W)	N	Not examined
10302	SS (5W)	Kidney Cyst, Unilateral	Kidney Cyst, Unilateral(1) Hyaline droplet, tubular epithelium, proximal, Bilateral(1)
10303	SS (5W)	Skin Crust	Skin Crust(1) Subcutis Inflammatory cell infiltration, focal(1)
10304	SS (5W)	N	Not examined
10305	SS (5W)	Spleen Scar Kidney Cyst, Unilateral	Kidney Cyst, Unilateral(1) Hyaline droplet, tubular epithelium, proximal, Bilateral(1) N : Spleen
10306	SS (5W)	Skin Loss of hair, local	Skin Crust(1) Subcutis Inflammatory cell infiltration, focal(1)

SS , Scheduled sacrifice
1 , Slight
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
10401	SS (5W)	N	Stomach Inflammatory cell infiltration, glandular stomach, focal(1) Liver Inflammatory cell infiltration, focal(1) Microgranuloma(1) Epididymis Inflammatory cell infiltration, lymphocyte, focal, Bilateral(1) Prostate Inflammatory cell infiltration, focal(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Kidney, Urinary bladder, Testis, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
10402	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) Kidney Basophilic tubule, Unilateral(1) Adrenal Increase in lipid droplet, fascicular zone, Bilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Testis, Epididymis, Prostate, Pituitary, Thyroid, Parathyroid, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
10403	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) Kidney Hyaline droplet, tubular epithelium, proximal, Bilateral(1) Prostate Inflammatory cell infiltration, focal(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Testis, Epididymis, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland

SS , Scheduled sacrifice
1 , Slight
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
10404	SS (5W)	N	Liver Microgranuloma(1) Kidney Basophilic tubule, Unilateral(1) Hyaline droplet, tubular epithelium, proximal, Bilateral(1) Inflammatory cell infiltration, lymphocyte, interstitium, focal, Unilateral(1) Epididymis Inflammatory cell infiltration, lymphocyte, focal, Bilateral(1) Thyroid Ectopic thymic tissue, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Testis, Prostate, Pituitary, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
10405	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) Kidney Hyaline droplet, tubular epithelium, proximal, Bilateral(1) Epididymis Inflammatory cell infiltration, lymphocyte, focal, Unilateral(1) Thyroid Ultimobranchial remnant, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Testis, Prostate, Pituitary, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
10406	SS (5W)	Skin Crust	Liver Necrosis, focal(1) Epididymis Inflammatory cell infiltration, lymphocyte, focal, Bilateral(1) Skin Dermatitis, focal(1) Subcutis Inflammatory cell infiltration, focal(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Kidney, Urinary bladder, Testis, Prostate, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland

SS , Scheduled sacrifice
1 , Slight
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
10407	SS (7W)	N	Not examined
10408	SS (7W)	N	Not examined
10409	SS (7W)	N	Not examined
10410	SS (7W)	N	Not examined
10411	SS (7W)	N	Not examined
10412	SS (7W)	Lung Brown patch	Lung Hemorrhage, focal(1)

SS , Scheduled sacrifice
1 , Slight
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
50101	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Kidney, Urinary bladder, Ovary, Uterus, Vagina, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50102	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) Microgranuloma(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Kidney, Urinary bladder, Ovary, Uterus, Vagina, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50103	SS (5W)	N	Lung Accumulation, foam cell(1) Liver Inflammatory cell infiltration, focal(1) Ovary Cyst, corpus luteum, Unilateral(1) Thyroid Ultimobranchial remnant, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Kidney, Urinary bladder, Uterus, Vagina, Pituitary, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50104	SS (5W)	N	Kidney Basophilic tubule, Unilateral(1) Uterus Dilatation, lumen(1) Vagina Hyperplasia, mucosal epithelium(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Liver, Urinary bladder, Ovary, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland

SS , Scheduled sacrifice
1 , Slight
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
50105	SS (5W)	N	Kidney Inflammatory cell infiltration, lymphocyte, interstitium, focal, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Liver, Urinary bladder, Ovary, Uterus, Vagina, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50106	SS (5W)	N	N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Liver, Kidney, Urinary bladder, Ovary, Uterus, Vagina, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50107	SS (7W)	N	Not examined
50108	SS (7W)	N	Not examined
50109	SS (7W)	N	Not examined
50110	SS (7W)	N	Not examined
50111	SS (7W)	N	Not examined
50112	SS (7W)	N	Not examined

SS , Scheduled sacrifice
1 , Slight
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
50201	SS (5W)	N	Not examined
50202	SS (5W)	N	Not examined
50203	SS (5W)	Liver Hepatodiaphragmatic nodule	Liver Inflammatory cell infiltration, focal(1) Microgranuloma(1)
50204	SS (5W)	N	Not examined
50205	SS (5W)	N	Not examined
50206	SS (5W)	Skin Loss of hair, local	Skin Atrophy, hair follicle(1)

SS , Scheduled sacrifice
1 , Slight
N , Finding absent

Twenty-eight-day Repeated Oral Dose Toxicity Study of Zinc sulfide(ZnS) in Rats — Study No. B000875

Appendix 14- 7 Pathological Findings — ZnS — 200 mg/kg — Female

Animal No.		Necropsy Findings	Histological Findings
50301	SS (5W)	N	Not examined
50302	SS (5W)	N	Not examined
50303	SS (5W)	N	Not examined
50304	SS (5W)	N	Not examined
50305	SS (5W)	N	Not examined
50306	SS (5W)	N	Not examined

SS , Scheduled sacrifice
N , Finding absent

Animal No.		Necropsy Findings	Histological Findings
50401	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) Microgranuloma(1) Thyroid Ultimobranchial remnant, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Kidney, Urinary bladder, Ovary, Uterus, Vagina, Pituitary, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50402	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) Kidney Basophilic tubule, Unilateral(1) Inflammatory cell infiltration, lymphocyte, interstitium, focal, Bilateral(1) Ovary Cyst, follicle, Unilateral(1) Thyroid Ectopic thymic tissue, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Urinary bladder, Uterus, Vagina, Pituitary, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50403	SS (5W)	N	Kidney Inflammatory cell infiltration, focal, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Liver, Urinary bladder, Ovary, Uterus, Vagina, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50404	SS (5W)	N	Liver Fatty change, hepatocyte, periportal(1) Inflammatory cell infiltration, focal(1) Ovary Cyst, follicle, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Kidney, Urinary bladder, Uterus, Vagina, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland

SS : Scheduled sacrifice
1 : Slight
N : Finding absent

Animal No.		Necropsy Findings	Histological Findings
50405	SS (5W)	N	Vagina Inflammatory cell infiltration, diffuse(1) Thyroid Ectopic thymic tissue, Unilateral(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Liver, Kidney, Urinary bladder, Ovary, Uterus, Pituitary, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50406	SS (5W)	N	Liver Inflammatory cell infiltration, focal(1) N : Heart, Mandibular lymph node, Mesenteric lymph node, Thymus, Spleen, Bone marrow (femur), Trachea, Lung, Stomach, Duodenum, Jejunum, Ileum, Cecum, Colon, Rectum, Kidney, Urinary bladder, Ovary, Uterus, Vagina, Pituitary, Thyroid, Parathyroid, Adrenal, Brain, Spinal cord, Sciatic nerve, Bone (femur), Eyeball, Harderian gland
50407	SS (7W)	N	Not examined
50408	SS (7W)	N	Not examined
50409	SS (7W)	N	Not examined
50410	SS (7W)	N	Not examined
50411	SS (7W)	N	Not examined
50412	SS (7W)	N	Not examined

SS : Scheduled sacrifice
1 : Slight
N : Finding absent