

**NONCLINICAL DRUG SAFETY  
ASSESSMENT REQUIREMENTS TO OPEN  
AN IND/FIH TRIAL  
GENERAL & SPECIAL CASES  
PHARMATEK U. PRESENTATION**

**Shayne C. Gad, Ph.D., DABT, ATS**

**Gad Consulting Services**

**102 Woodtrail Lane**

**Cary, NC 27511**

**Phone: 919-233-2926 Fax: 919-233-2927**

**E-mail: [scgad@ix.netcom.com](mailto:scgad@ix.netcom.com)**

**Web Site: <http://www.gadconsulting.com>**

# POINTS TO CONSIDER



- THERE ARE MORE THAN 7,000 PHARMACEUTICAL COMPANIES (AT LEAST 3,800 IN THE U.S ALONE)
- OVER 16,000 ACTIVE DRUGS IN R&D IN 2007
- ORPHAN DRUGS SAME AS OTHERS FOR REGULATORY REQUIREMENTS
- NDAs come in all flavors:
  - 505(b)(1)//505(b)(2)//ANDA

# NON-CLINICAL SAFETY ASSESSMENT



NON-CLINICAL SAFETY ASSESSMENT SERVES FOUR SEPARATE STAGES IN DRUG/DEVICE DEVELOPMENT

0) SCREENING TO ID LEADS

1) TO SUPPORT FIRST IN MAN TRIALS (IND/IDE)

2) TO SUPPORT CONTINUED CLINICAL DEVELOPMENT

3) TO SUPPORT MARKETING APPROVAL

# SCREENING STUDIES TO IDENTIFY LEADS



- 1) GENERALLY NON-GLP. THIS DOES NOT INCLUDE “EXPANDED ACUTES” FOR EXPLORATORY INDs
- 2) SCREENING AMES, hERG (10  $\mu$ M), SINGLE DOSE ACUTES MOST COMMON

# FOR REQUIRED TESTS



- Must be GLP
- Should have audited draft report for FDA filing

# TOXICOLOGY STUDIES



TOXICOLOGY STUDIES CAN BE CONSIDERED  
AS EITHER:

**A) HAZARD SCREENS**

OR

**B) SYSTEMIC TOXICOLOGY**

(B) ARE DRIVEN ONLY BY CLINICAL  
EXPOSURE LEVELS

# SPECIES SELECTION



<u>RODENT</u>	<u>NONRODENT</u>	<u>SPECIAL USE</u>
Mouse	Dog	Rabbit*
Rat	Primate	Hamster
	Pig	Ferret

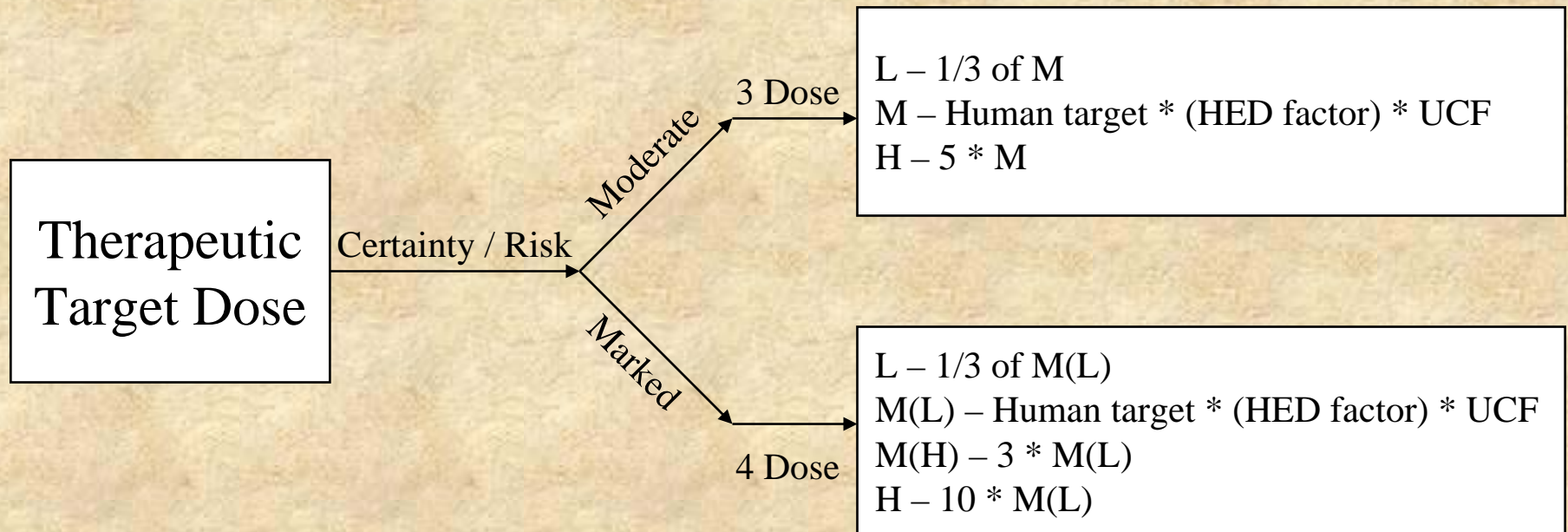
\*May also be used as nonrodents

# REPEAT DOSE STUDY: Dose Selection



- The low dose should show no (toxicological) effect and preferably exceed the expected human AUC
- The high dose should show clear toxicity
- Intermediate dose(s) should show minor (beginning) effects
- The dose range should reflect the expected human dose, route and regimen.

# Two Dose Selection Schemes



# General Guidelines for Maximum Dose Volume

## General Guidelines for Maximum Dose Volumes by Route

Route	Volume should not exceed (ml/kg)	Notes
Oral	20	Fasted animals
Dermal	2	Limit is accuracy of dosing per available body surface
Intravenous	1	Over 5 minute
Intramuscular	0.5	At one site
Perocular	0.01 ml	
Rectal	0.5	
Vaginal	0.2 ml in rat 1 ml in rabbit	
Inhalation	2 mg/liter	
Nasal	0.1 ml per nostril in monkey or dog	

(Baker et al., 1979; Garramone, 1986)

# THE GENERAL CASE NEVER FULLY APPLIES

- BIOLOGICS
- OPHTHALMICS
- TOPICALS
- PARENTERALS
- GENERAL SAFETY TESTS-21 CFR SECT.610.9 >  
DAYS ADMIN IN MICE AND GUINEA PIGS
- THE ANIMAL RULE
- NOT ALL DRUGS REQUIRE IND FOR FIM  
(RADIO PHARMACEUTICALS AND IMAGING  
AGENTS)

# General Case: Oral Route

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (Oral and IV*)	R/M
2) Acute toxicity in nonrodents (Oral)	D/S/P
3) 7-day DRF toxicity in rodents (Oral)	R/M
4)7-day DRF toxicity in nonrodents(Oral)	D/S/P
5) Genotoxicity: Bacterial mutagenicity (Ames)	<i>In vitro</i>
6) Genotoxicity: <i>In vitro</i> clastogenicity (CHO chromosome aberration)	<i>In vitro</i>
7) Genotoxicity: <i>In vivo</i> (mouse or rat micronucleus)	R/M
8) * Safety pharmacology: CV-hERG	<i>In vitro</i>
9) Safety pharmacology: CV <i>in vivo</i>	D/P/S
10) Safety pharmacology: FOB/Irwin	R/M
11) Safety pharmacology: Respiratory- Rodent	R
12) Pivotal/repeat dose in rodents (14-28 day oral)	R/M
13) Pivotal/repeat dose in nonrodents (14-28 day oral)	D/P/S
14)* CYP induction/inhibition	<i>In vitro</i>
15)* Five species micrososome metabolic panel	<i>In vitro</i>
16) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA

# General Case: Oral Route (Cont.)

TEST REQUIRMENT	SPECIES
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
17) Developmental Tox (Seg II) – rat and rabbit pilots and rat and rabbit studies	R/B
18) Immunotoxicity	TBD
19) Pivotal/repeat dose in rodents (3/6 month oral)	R/M
20) Pivotal/repeat dose in nonrodents (3/9-12 month oral)	D/P/S
<b>TO SUPPORT MARKETING APPROVAL</b>	
21) Reproductive Toxicity – Seg I	R
22) Reproductive Toxicity – Seg III	R
23) Tumorigenicity/Carcinogenicity - Rat	R
24) Tumorigenicity/Carcinogenicity - Mouse	M
<p>* <b>Recommended</b>            ** <b>May be required</b>  <b>SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit</b>  <b>TBD= To be determined</b>  <b>All studies described above must be performed GLP.</b></p>	

# General Case: Oral Exploratory / Phase 0 IND

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Enhanced Acute toxicity in rodents (Oral)	R/M
2) Enhanced Acute toxicity in nonrodents (Oral)	D/S/P
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
17) Developmental Tox (Seg II) - rat and rabbit pilots and rat and rabbit studies	R/B
18) Immunotoxicity	TBD
19) Pivotal/repeat dose in rodents (3/6 month oral)	R/M
20) Pivotal/repeat dose in nonrodents (3/9-12 month oral)	D/P/S
<b>TO SUPPORT MARKETING APPROVAL</b>	
21) Reproductive Toxicity - Seg I	R
22) Reproductive Toxicity - Seg III	R
23) Tumorigenicity/Carcinogenicity - Rat	R
24) Tumorigenicity/Carcinogenicity - Mouse	M
No route to approval or more than initial study	

# Special Case: Non-Oral/Non-Topical Route

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents	R/M
2) Acute toxicity in nonrodents	D/S/P
3) 7-day DRF toxicity in rodents	R/M
4)7-day DRF toxicity in nonrodents	D/S/P
5) Genotoxicity: Bacterial mutagenicity (Ames)	<i>In vitro</i>
6) Genotoxicity: <i>In vitro</i> clastogenicity (CHO chromosome aberration)	<i>In vitro</i>
7) Genotoxicity: <i>In vivo</i> (mouse or rat micronucleus)	R/M
8) * Safety pharmacology: CV-hERG	<i>In vitro</i>
9) Safety pharmacology: CV <i>in vivo</i>	D/P/S
10) Safety pharmacology: FOB/Irwin	R/M
11) Safety pharmacology: Respiratory- Rodent	R
12) Pivotal/repeat dose in rodents (14-28 day)	R/M
13) Pivotal/repeat dose in nonrodents (14-28 day)	D/P/S
14)* CYP induction/inhibition	<i>In vitro</i>
15)* Five species microsome metabolic panel	<i>In vitro</i>
16) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA
17) Local Irritation (Venous/Muscle- Clinical formulation) Redo as formulation change	<b>B</b>

# Special Case: Non-Oral/Non-Topical Route (Cont.)

TEST REQUIRMENT	SPECIES
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
18) Developmental Tox (Seg II) – rat and rabbit pilots and rat and rabbit studies	R/B
19) Hemolysis (Clinical formulation)	<i>In vitro</i>
20) Immunotoxicity	TBD
21) Pivotal/repeat dose in rodents (3/6 month oral)	R/M
22) Pivotal/repeat dose in nonrodents (3/9-12 month oral)	D/P/S
<b>TO SUPPORT MARKETING APPROVAL</b>	
23) Reproductive Toxicity – Seg I	R
24) Reproductive Toxicity – Seg III	R
25) Tumorigenicity/Carcinogenicity – Rat	R
26) Tumorigenicity/Carcinogenicity - Mouse	M

\* Recommended

\*\* May be required

SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit TBD= To be determined

All studies described above must be performed GLP.

# Special Case: Topical Agents

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (IV*)	R/M
2) Acute toxicity in nonrodents	D/S/P
3) 7-day DRF toxicity in rodents	R/M
4)7-day DRF toxicity in nonrodents	D/S/P
5) Genotoxicity: Bacterial mutagenicity (Ames)	<i>In vitro</i>
6) Genotoxicity: <i>In vitro</i> clastogenicity (CHO chromosome aberration)	<i>In vitro</i>
7) Genotoxicity: <i>In vivo</i> (mouse or rat micronucleus)	R/M
8) * Safety pharmacology: CV-hERG	<i>In vitro</i>
9) Safety pharmacology: CV <i>in vivo</i>	D/P/S
10) Safety pharmacology: FOB/Irwin	R/M
11) Safety pharmacology: Respiratory- Rodent	R
12) Pivotal/repeat dose in rodents (14-28 day Intended route***)	R/M
13) Pivotal/repeat dose in nonrodents (14-28 day Intended route***)	D/P/S
14)* CYP induction/inhibition	<i>In vitro</i>
15)* Five species micrososome metabolic panel	<i>In vitro</i>
16) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA
17) Local Irritation *** (Clinical formulation)	R
18) Of dermal - sensitization	G

# Special Case: Topical Agents (Cont.)

TEST REQUIRMENT	SPECIES
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
19) Developmental Tox (Seg II) – rat and rabbit pilots and rat and rabbit studies	R/B
20) Immunotoxicity***(If immune modulatory claim or there are findings in 14/28 dog studies	TBD
21) Pivotal/repeat dose in rodents (3/6 month oral)	R/M
22) Pivotal/repeat dose in nonrodents (3/9-12 month oral)	D/P/S
<b>TO SUPPORT MARKETING APPROVAL</b>	
23) Reproductive Toxicity – Seg I	R
24) Reproductive Toxicity – Seg III	R
25) Tumorigenicity/Carcinogenicity - Rat	R
26) Tumorigenicity/Carcinogenicity - Mouse	M
<p><b>* Recommended</b>  <b>** May be required</b>  <b>SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B= Rabbit</b>  <b>G= Guinea Pig TBD= To be determined</b>  <b>***Dermal/Ophthalmic/Vaginal/Rectal</b>  <b>All studies described above must be performed GLP.</b></p>	

# Special Case: Imaging Agents

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS***</b>	
1) Acute toxicity in rodents (IV) - Expanded	R/M
2) Acute toxicity in nonrodents (IV) - Expanded	D/S/P
3) Genotoxicity: Bacterial mutagenicity (Ames)	<i>In vitro</i>
4) Genotoxicity: <i>In vitro</i> clastogenicity (CHO chromosome aberration)	<i>In vitro</i>
5) Genotoxicity: <i>In vivo</i> (mouse or rat micronucleus)	R/M
6) Safety pharmacology: CV <i>in vivo</i>	D/P/S
7) Safety pharmacology: Respiratory- Rodent	R
8) Pivotal/repeat dose in nonrodents (14-28 day oral)	D/P/S
9) Develop Bioanalytical for 2 species (man/nonrodent)	NA
10) Hemolysis	<i>In vitro</i>
<b>TO SUPPORT MARKETING APPROVAL</b>	
11) Reproductive Toxicity – Seg I	R
<p>* <b>Recommended</b>            ** <b>May be required</b>            ***<b>Initial single dose clinical study at a single academic center may not require an IND.</b>  <b>SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit TBD= To be determined</b>  <b>All studies described above must be performed GLP.</b></p>	

# Special Case: Oncology Agents (Cytotoxic)

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (IV)	R/M
2) Acute toxicity in nonrodents (IV)	D/S/P
3) 7-day DRF toxicity in rodents (IV)	R/M
4)7-day DRF toxicity in nonrodents (IV)	D/S/P
5) * Safety pharmacology: CV-hERG	<i>In vitro</i>
6) Pivotal/repeat dose in rodents (14-28 day IV)	R/M
7) Pivotal/repeat dose in nonrodents (14-28 day IV)	D/P/S
8)* CYP induction/inhibition	<i>In vitro</i>
9)* Five species microsome metabolic panel	<i>In vitro</i>
10) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
10) Pivotal/repeat dose in rodents (3/6 month oral)	R/M
11) Pivotal/repeat dose in nonrodents (3/9-12 month oral)	D/P/S
<b>MARKETING APPROVAL</b>	
<p>* Recommended  ** May be required  SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit TBD= To be determined  All studies described above must be performed GLP.</p>	

# Special Case: Oncology Agents (Protein-Targeted Molecules)

TEST REQUIREMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (IV)	R/M
2) Acute toxicity in nonrodents (IV)	D/S/P
3) 7-day DRF toxicity in rodents (IV)	R/M
4) 7-day DRF toxicity in nonrodents (IV)	D/S/P
5) Safety pharmacology: CV <i>in vivo</i>	D/P/S
6) Safety pharmacology: FOB/Irwin	R/M
7) Safety pharmacology: Respiratory- Rodent	R
8) Pivotal/repeat dose in rodents (14-28 day IV)	R/M
9) Pivotal/repeat dose in nonrodents (14-28 day IV)	D/P/S
10)* CYP induction/inhibition	<i>In vitro</i>
11)* Five species microsome metabolic panel	<i>In vitro</i>
12) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA

# Special Case: Oncology Agents (Protein-Targeted Molecules) (Cont.)

TEST REQUIRMENT	SPECIES
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
13) Developmental Tox (Seg II) – rat and rabbit pilots and rat and rabbit studies	R/B
14) Immunotoxicity	TBD
15) Pivotal/repeat dose in nonrodents (3/6 month oral)	D/P/S
<b>TO SUPPORT MARKETING APPROVAL</b>	
16) Reproductive Toxicity – Seg I	R
17) Reproductive Toxicity – Seg III	R
<p>* Recommended  ** May be required  SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit  TBD= To be determined  All studies described above must be performed GLP.</p>	

# Special Case: HIV/ALS

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (Intended clinical route)	R/M
2) Acute toxicity in nonrodents (Intended clinical route)	D/S/P
3) 7-day DRF toxicity in rodents (Intended clinical route)	R/M
4)7-day DRF toxicity in nonrodents (Intended clinical route)	D/S/P
5) Genotoxicity: Bacterial mutagenicity (Ames)	<i>In vitro</i>
6) Genotoxicity: <i>In vitro</i> clastogenicity (CHO chromosome aberration)	<i>In vitro</i>
8) * Safety pharmacology: CV-hERG	<i>In vitro</i>
9) Safety pharmacology: CV <i>in vivo</i>	D/P/S
10) Safety pharmacology: FOB/Irwin	R/M
11) Safety pharmacology: Respiratory- Rodent	R
12) Pivotal/repeat dose in rodents (14-28 day Intended clinical route)	R/M
13) Pivotal/repeat dose in nonrodents (14-28 day Intended clinical route)	D/P/S
14)* CYP induction/inhibition	<i>In vitro</i>
15)* Five species micrososome metabolic panel	<i>In vitro</i>
16) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA
17) If route other than oral – local tissue irritation	

# Special Case: HIV/ALS (Cont.)

TEST REQUIRMENT	SPECIES
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
18) Developmental Tox (Seg II) – rat and rabbit pilots and rat and rabbit studies	R/B
19) Immunotoxicity (Required)	TBD
20) Pivotal/repeat dose in rodents (3/6 month Intended clinical route)	R/M
21) Pivotal/repeat dose in nonrodents (3/9-12 month Intended clinical route)	D/P/S
<b>TO SUPPORT MARKETING APPROVAL</b>	
22) Reproductive Toxicity – Seg I	R
23) Reproductive Toxicity – Seg III	R
24) Tumorigenicity/Carcinogenicity - Rat	R
25) Tumorigenicity/Carcinogenicity - Mouse	M
<p>* <b>Recommended</b>            ** <b>May be required</b>  <b>SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit</b>  <b>TBD= To be determined</b>  <b>All studies described above must be performed GLP.</b></p>	

# Special Case: Life Threatening Short Use\*\*\* Indications

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (Intended route)	R/M
2) Acute toxicity in nonrodents (Intended route)	D/S/P
3) 7-day DRF toxicity in rodents (Intended route)	R/M
4)7-day DRF toxicity in nonrodents (Intended route)	D/S/P
5) Genotoxicity: Bacterial mutagenicity (Ames)	<i>In vitro</i>
6) * Safety pharmacology: CV-hERG	<i>In vitro</i>
7) Safety pharmacology: CV <i>in vivo</i>	D/P/S
8) Pivotal/repeat dose in rodents (14-28 day oral)	R/M
9) Pivotal/repeat dose in nonrodents (14-28 day oral)	D/P/S
10)* CYP induction/inhibition	<i>In vitro</i>
11)* Five species microsome metabolic panel	<i>In vitro</i>
12) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
13) Pivotal/repeat dose in rodents (3/6 month oral)	R/M
14) Pivotal/repeat dose in nonrodents (3/9-12 month oral)	D/P/S
<p>* <b>Recommended</b>            ** <b>May be required</b>            ***<b>Less than 14 days clinical use</b>  <b>SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit TBD= To be determined</b></p> <p><b>All studies described above must be performed GLP.</b></p>	

# Special Case: 505b(2) Registrations

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (Intended route)	R/M
2) Acute toxicity in nonrodents (Intended route)	D/S/P
3) 7-day DRF toxicity in rodents (Intended route)	R/M
4)7-day DRF toxicity in nonrodents (Intended route)	D/S/P
5) * Safety pharmacology: CV-hERG	<i>In vitro</i>
6) Safety pharmacology: CV <i>in vivo</i>	D/P/S
7) Pivotal/repeat dose in nonrodents (14-28 day oral)	D/P/S
8)* CYP induction/inhibition	<i>In vitro</i>
9)* Five species microsome metabolic panel	<i>In vitro</i>
10) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
11) Developmental Tox (Seg II) – rat and rabbit pilots and rat and rabbit studies	R/B
12) Pivotal/repeat dose in nonrodents (3/9-12 month oral)	D/P/S
<b>TO SUPPORT MARKETING APPROVAL</b>	
13) Bioequivalence study in appropriate species	

\* **Recommended**

\*\* **May be required** SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit TBD= To be determined

**All studies described above must be performed GLP.**

# Special Case: ANDA

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
2) Acute toxicity in nonrodents (Oral)	D/S/P
13) Pivotal/repeat dose in nonrodents (28 day oral bioequivalency)	D/P/S
16) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA
<b>TO SUPPORT MARKETING APPROVAL</b>	
21) In Silico and Human bioequivalence	
<p>* <b>Recommended</b>            ** <b>May be required</b>  <b>SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit</b>  <b>TBD= To be determined</b>  <b>All studies described above must be performed GLP.</b></p>	

# Special Case: Biotechnology Derived Drugs

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (Oral and IV*)	R/M
2) Acute toxicity in nonrodents (Oral)	D/S/P
3) 7-day DRF toxicity in rodents (Oral)	R/M
4)7-day DRF toxicity in nonrodents(Oral)	D/S/P
5) Genotoxicity only if appropriate (species cases)	
6) Safety pharmacology: CV <i>in vivo</i>	D/P/S
7) Safety pharmacology: Respiratory- Rodent	R
8) Pivotal/repeat dose in rodents (14-28 day oral)	R/M
9) Pivotal/repeat dose in nonrodents (14-28 day oral)	D/P/S
10)* Five species microsome metabolic panel	<i>In vitro</i>
11) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA
12) Antibody based assay to select appropriate species	

# Special Case: Biotechnology Derived Drugs (Cont.)



<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
13) Immunotoxicity	TBD
14) Pivotal/repeat dose in rodents (3/6 month oral)	R/M
15) Pivotal/repeat dose in nonrodents (3/9-12 month oral)	D/P/S
<b>TO SUPPORT MARKETING APPROVAL</b>	
16) Reproductive Toxicity – Seg I	R
17) Reproductive Toxicity – Seg III	R
<b>* Recommended</b>	
<b>** May be required</b>	
<b>SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit</b>	
<b>TBD= To be determined</b>	
<b>All studies described above must be performed GLP.</b>	

# Special Case: Vaccines

TEST REQUIRMENT	SPECI ES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (Oral and IV*)	R/M
2) Acute toxicity in nonrodents (Oral)	D/S/P
8) Pivotal/repeat dose in rodents (14-28 day oral)	R/M
9) Pivotal/repeat dose in nonrodents (14-28 day oral)	D/P/S
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT &amp; TO SUPPORT MARKETING APPROVAL</b>	
13) Immunotoxicity	TBD
<p>* Recommended            ** May be required            SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit            TBD= To be determined            All studies described above must be performed GLP.</p>	

# Special Case: Biologics

TEST REQUIREMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (Oral and IV*)	R/M
2) Acute toxicity in nonrodents (Oral)	D/S/P
3) 7-day DRF toxicity in rodents (Oral)	R/M
4) 7-day DRF toxicity in nonrodents (Oral)	D/S/P
5) Genotoxicity: Bacterial mutagenicity (Ames)	<i>In vitro</i>
6) Pivotal/repeat dose in rodents (28 day oral)	R/M
7) Pivotal/repeat dose in nonrodents (28 day oral)	D/P/S
8) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
9) Developmental Tox (Seg II) – rat and rabbit pilots and rat and rabbit studies	R/B
10) Neoantigenicity	B
<b>TO SUPPORT MARKETING APPROVAL</b>	

\* Recommended

\*\* May be required

SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit TBD= To be determined

All studies described above must be performed GLP.

# Special Case: Excipients

TEST REQUIRMENT	SPECIES
<b>INITIAL CLINICAL TRIAL/IND REQUIREMENTS</b>	
1) Acute toxicity in rodents (Oral and IV*)	R/M
2) Acute toxicity in nonrodents (Oral)	D/S/P
3) 7-day DRF toxicity in rodents (Oral)	R/M
4)7-day DRF toxicity in nonrodents(Oral)	D/S/P
5) Genotoxicity: Bacterial mutagenicity (Ames)	<i>In vitro</i>
6) Genotoxicity: <i>In vitro</i> clastogenicity (CHO chromosome aberration)	<i>In vitro</i>
7) Genotoxicity: <i>In vivo</i> (mouse or rat micronucleus)	R/M
8) * Safety pharmacology: CV-hERG	<i>In vitro</i>
9) Safety pharmacology: CV <i>in vivo</i>	D/P/S
10) Safety pharmacology: FOB/Irwin	R/M
11) Safety pharmacology: Respiratory- Rodent	R
12) Pivotal/repeat dose in rodents (14-28 day oral)	R/M
13) Pivotal/repeat dose in nonrodents (14-28 day oral)	D/P/S
14)* CYP induction/inhibition	<i>In vitro</i>
15)* Five species microsome metabolic panel	<i>In vitro</i>
16) Develop Bioanalytical for 3 species (man/rodent/nonrodent)	NA

# Special Case: Excipients (Cont.)

TEST REQUIREMENT	SPECIES
<b>TO SUPPORT CONTINUED CLINICAL DEVELOPMENT</b>	
17) Developmental Tox (Seg II) – rat and rabbit pilots and rat and rabbit studies	R/B
18) Immunotoxicity	TBD
19) Pivotal/repeat dose in rodents (3/6 month oral)	R/M
20) Pivotal/repeat dose in nonrodents (3/9-12 month oral)	D/P/S
<b>TO SUPPORT MARKETING APPROVAL</b>	
21) Reproductive Toxicity – Seg I	R
23) Tumorigenicity/Carcinogenicity - Rat	R
<p>* <b>Recommended</b>            ** <b>May be required</b>  <b>SPECIES: R= Rat M= Mouse D= Dog S= Pig P= Primate B=Rabbit</b>  <b>TBD= To be determined</b>  <b>All studies described above must be performed GLP.</b></p>	

# CONTRACT LABORATORIES



## THE BIG

Covance*	Charles River*	MPI	Battelle	WIL
SNBL*	MDS Pharma		Huntingdon*	CIT

## THE MID-SIZE

BASi	Toxikon	Stillmeadow	Ricerca	LABs
ITR	Calvert	IITRI	SRI	RTI
Aptuit	USG	Bridge*	Southern Research	Harlan*

## THE SPECIALIZED

NAMSA	INVITROGEN	In Vitro Tech	SITEK	BRT
CHAN Test	Liberty Labs	Skeletech	Midwest Bioresearch	Parsolt

## THE EXTINCT

Bushy Run	Oread	FDRL	Tegaris	UTBL
Midatlantic	Litton Bionetics	U. Miami	IBT	Cannon Labs

\*Multiple site Tox. CRO's

# TOXICOLOGY LAB LISTINGS

Lab	Location	Phone #	Website	Additional Services	Rat	Rabbits	Dog	Carcinogen icity	DART	Inhalation	Primate	Pig	IV Infusion	Genotoxic	Devices	Metabolism	Analytical	Special Studies	
ABC Labs.	Missouri, IA N. Ireland, UK	(573) 474-8579 44 (0) 2870 320 639	www.abclabs.com	Bioanalysis, methods development	X											X	X		
ADMETRx	Kalamazoo	(269)-372-3272	www.admetrx.com	Yes															
Applied Preclinical Services	Oxford, NJ	(908) 637-4427	NO		X		X			X		X					X		
Apptec	St. Paul, Minn. Camden, N.J	800-622-8820	www.apptecls.com	microbiology										X	X				
Aptuit	Ledbury, UK & US	44 (0) 131 451 2560 878-988-2100	<a href="http://www.quintiles.com">www.quintiles.com</a>	Yes, clinical development, +	X	X	X	X	X			X	X	X	X	X	X	X	SP
Austrian Research Center	Seibersdorf, Austria	43(0) 50550-0	www.arcs.ac.at/		X	X			X										SP
BAS	West Lafayette, IN	(800) 845-4246	www.bioanalytical.com	Yes	X	X	X	X	X		X	X	X	X	X	X	X	X	
Battelle	Columbus, OH Richland, WA	(800) 201-2011	www.battelle.org	Yes	X	X	X	X	X	X	X	X	X				X	X	
BEC Labs	Toledo, OH	(419) 693-5307 (888) BEC-LABS	www.beclabs.com	Yes												X			
Bioagri	Piracicaba, Campinas and Sao Paulo- BRAZIL	+55-19-3429-7720	www.bioagri.com.br	None	X	X	X	X						X		X	X		
Biocon	Rockville, MD	800-826-8426	<a href="http://www.bioconinc.com">www.bioconinc.com</a>	ferrets, disease models	X	X													
Bio-Life	Neillsville, WI	(715) 743-3171	NO	Yes											X			WL	
Bio-Quant	San Diego, CA	858-450-0048	www.bio-quant.com	Tumor models, Disease models	X		X					X					X		
BioReliance / Invitrogen	Rockville, MD	(800) 738-1000	www.bioreliance.com	*Full range Genotoxicity, Transgenic mouse CA models, MPI p53	X	X							X	X			X		
Biotechnics	Hillsborough, NC	(919) 245-3114	www.biotechnics-inc.com	Yes	X	X	X							X					
BRI	Vancouver, BC	(604) 432-9237	www.bripharm.com	Yes, Pharmaceutical, Development, +	X									X		X	X		

# TOXICOLOGY LAB LISTINGS (Cont.)

Lab	Location	Phone #	Website	Additional Services	Rat	Rabbits	Dog	Carcinogenicity	DART	Inhalation	Primate	Pig	IV Infusion	Genotoxic	Devices	Metabolism	Analytical	Special Studies		
BRIDGE	Beijing, China Gaithersburg, MD	+650-859-3853	<a href="http://www.bridgepharmaceuticals.com">www.bridgepharmaceuticals.com</a>	regulatory consulting	X		X				X		X	X		X	X			
BRT	Raleigh, NC	(919) 851-4499	<a href="http://www.futureciy.com/westwood/saks/135/brt/location.html">www.futureciy.com/westwood/saks/135/brt/location.html</a>	*Specialty immunotox	X	X									X					
BTC	Irvine, CA	(949) 660-3185	<a href="http://www.biologicaltestcenter.com">www.biologicaltestcenter.com</a>	Yes, Pediatrics, +	X	X	X					X	X	X	X	X	X			
Calvert	Olyphant, PA	(570) 586-2411	<a href="http://www.calvertlabs.com">www.calvertlabs.com</a>	Yes	X	X	X	X	X		X	X	X		X	X	X	SP		
CEDRA	Austin, TX	(512) 834-7766	<a href="http://www.cedracorp.com">www.cedracorp.com</a>	Yes														X		
Celsis	St. Louis, MO	(314) 487-6776	<a href="http://www.celsislabs.com">www.celsislabs.com</a>	Yes, stability, methods	X			X	X	X				X	X	X	X	X		
Central Toxicology Labs. (Sygenta)	Alderley Park Macclesfield SK10 4TJ UK	+44 16255 15852 (p) +44 16255 17314 (f)	<a href="http://www.syngenta.com">www.syngenta.com</a>	Yes	X	X	X	X	X	X	X		X	X		X	X	SP		
Cerep	Redmond, WA	(425) 895-8666	<a href="http://www.cerep.com">www.cerep.com</a>	Chemistry, in vitro PK, hERG										X				SP		
CeeTox Inc.	Kalamazoo, MI	269.353.5555	<a href="http://www.ceetox.com">www.ceetox.com</a>	Chemistry, in vivo, cell culture												X	X	X		
Chantest	Cleveland, OH	(216) 332-1665 (p) (216) 332-1706 (f)	<a href="http://www.chantest.com">www.chantest.com</a>	hERG, ion channels																
Charles River	Worcester, MA	(508) 890 -0100	<a href="http://www.criver.com">www.criver.com</a>	Tumor models, implant studies	X	X	X				X	X	X		X	X	X	SP		
	Redfield, AR	(501) 397-2540		Ocular Tox IOP's	X	X	X	X				X	X							
	Sparks, NV*	(775) 331-2201		*Primate DART, immunotox					X		X		X				X	X	SP	
	Horsham, PA**	(215) 443-8710		** Photocarc Ferret emesis	X	X			X										SP	
	Spencerville, OH	(419) 647-4196		Acute Testing	X	X	X	X	X	X	X		X	X						
	Tranent, Scotland (Inveresk)	440 187 561 4555		Clinical, Ferret emesis	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	SP WL
	Montreal, QU (CTBR)	(514) 630-8200		Clinical, ferret emesis, Immunotox	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	SP
Cirion	Canada	(450) 688-6445	<a href="http://www.cirion.ca">www.cirion.ca</a>	Yes, clinical	X	X	X				X	X		X	X	X				

# TOXICOLOGY LAB LISTINGS (Cont.)

Lab	Location	Phone #	Website	Additional Services	Rat	Rabbits	Dog	Carcinogen idiv	DART	Inhalation	Primate	Pig	IV Infusion	Genotoxic	Devices	Metabolism	Analytical	Special Studies	
CIT – Centre Internat. De Toxicologie	Cedex France	+33 2 32 292626 (p) +33 2 32 678705 (f)	<a href="http://www.citox.com">www.citox.com</a>		X	X	X	X	X		X	X	X	X		X	X	SP	
Clintox Bioservices	Hyderabad, India	91(40)55153222	<a href="http://www.clintoxbio.com">www.clintoxbio.com</a>	Phototox Hamsters	X	X										X		SP	
Commonwealt h Biotechnologi es Inc.	Richmond, VA	(804) 648-3820	<a href="http://www.cbi-biotech.com">www.cbi-biotech.com</a>	Genomics		X													
Comparative Biosciences	Sunnyvale, CA	(408)-504-8871 (408) 738-9278	<a href="http://www.compbio.com">www.compbio.com</a>	*Special discovery, models	X	X							X		X	X	X		
CorDynamics	Chicago, IL	312-421-8876	<a href="http://www.cordynamics.com">www.cordynamics.com</a>	CV safety only															
Covance	Vienna, VA Madison, WI Harrogete, U.K. Muenster, FRG	(888) COVANCE (888) 541-LABS	<a href="http://www.covance.com">www.covance.com</a>	Clinical, consulting	X	X	X	X	X		X	X	X	X	X	X	X	SP SP	
CPTC	Fairfield, NJ	(973) 808-7111	<a href="http://www.cptclabs.com">www.cptclabs.com</a>	Yes, clinical +	X	X									X		X		
Dermtech	San Diego, CA	(800) 808-2774	<a href="http://www.dermtechintl.com">www.dermtechintl.com</a>	Yes, consulting						X	X								
Enviro-Bio- Tech-Ltd.	Bernville, PA	(610) 488-7664	NO	(chicken, cattle) (food animals)														X	WL
Experimur	Chicago, IL	312-842-9700	<a href="http://www.experimur.com">http://www.experimur.com</a>	PK	X	X	X	X	X		X	X	X						
Exygen	State College, PA	(800) 281-3219 (p) (800) 272-1019 (f)	<a href="http://www.exygen.com">www.exygen.com</a>	Methods, development													X	X	
Fraunhofer ITA	Nikolai-Fuchs Str. D-30625 Hannover Germany	+49 511 5353 0 (p) +49 511 5353 155(f)	<a href="http://www.ita.fhg.de">www.ita.fhg.de</a>		X	X	X	X	X	X				X		X	X		
Frontier Biosciences	China – US office	301-251-0231	<a href="http://www.frontierbsi.com">www.frontierbsi.com</a>	Animal disease models	X	X	X	X	X				X	X		X		SP	
Genelogic	Gaithersburg, MD	(301) 330-3733 800-436-3564	<a href="http://www.genelogic.com">www.genelogic.com</a>	Yes	X	X	X	X	X		X	X	X			X	X	SP	
Gibraltar Laboratories, Inc.	Fairfield, NJ	(973)-227-6882(p) (973)-227-0812(f)	<a href="http://www.gibraltarlabsinc.com">www.gibraltarlabsinc.com</a>	Microbiology	X	X								X	X				
Gwathmey	Cambridge, MA	(617) 491-0022 (p) (617) 492-5545 (f)	<a href="http://www.gwathmey.com">www.gwathmey.com</a>	Consulting, biology	X	X									X	X			
Harlan	Rehovot ISRAEL	972 (0) 8-9409451	[none]	Bioproducts, Breeder	X		X									X	X	SP	

# TOXICOLOGY LAB LISTINGS (Cont.)

Lab	Location	Phone #	Website	Additional Services	Rat	Rabbits	Dog	Carcinogen idity	DART	Inhalation	Primate	Pig	IV Infusion	Genotoxic	Devices	Metabolism	Analytical	Special Studies
Haskell Laboratory	Wilmington, DE	(306)- 366-5200		Yes	X	X	X	X	X					X		X	X	
Huntingdon	East Millstone, NJ Cambridgeshire, UK	(732) 873-2550 44 (0) 1480 892000	www.huntingdon.com	Discovery support	X X	X X	X	X X <sup>a</sup>	X X	X X	X	X	X	X		X	X X	SP
Industrial Toxicology Research Center (ITRC)	Lucknow Nadu, India	+91-522-2211547; Fax : +91-522 2228227	www.itrcindia.org/index.html	Irritation, behavioural				X	X					X				
Intox	Pune, India	+91 22923633	<a href="http://www.intoxlab.com/html/profile.htm">www.intoxlab.com/html/profile.htm</a>	Irritation, Farm animals	X	X		X	X					X				
Inveresk	Tranent, Scotland Montreal, QU	44 (0) 1875 614555 (514) 630-8200	www.inveresk.com	Clinical, ferret emesis	X X	X X	X X	X X	X X	X X	X	X	X	X		X	X X	SP SP
Irvine Analytical Labs, Inc.	Irvine, CA	(877) 445-6554	www.ialab.com	Yes						X							X	
Intl. Inst. of Biotech and Toxicology	Tamil Nadu, India	+91-4111-274246 +91-4111-274455		Biotechnology, Entomology, Agronomy													X	
Intl. Hungary Ltd.	Veszprem, Hungary	+36-1-4314840 fax +36-88-545-301	www.trc.hu	Yes toxicology	X	X	X	X		X			X			X		
IPS Therapeutique	Sherbrooke Quebec	819-564-5391 (p) 819-820-6831 (f)	www.ipstherapeutique.com/	hERG testing CV, safety pharm														
ITL Labs Ltd.	Delhi, India	91-11-27915654	www.indiamart.com/itl/															X
ITR	Montreal, OU	(514) 457-7400	www.itrlab.com	Affiliated labs	X	X	X	X	X	X	X		X	X		X	X	SP
ITRI	Albuquerque, NM	(408) 428-9988	www.itri.com	Yes	X			X		X								X
Jai Research Foundation International	Gujarat, India	+ 44 1684 891519	<a href="http://www.jrfonline.com">www.jrfonline.com</a>		X	X	X	X	X					X		X	X	
JSW Research	Austria		<a href="http://www.jswresearch.com">www.jswresearch.com</a>	Yes	X			X	X		X			X		X	X	
KIT (Korean Institute of Technology)	Korea	+82-42-610-8105	<a href="http://www.kitox.re.kr/eng_about.html">www.kitox.re.kr/eng_about.html</a>	Yes	X	X	X	X			X	X	X	X				
LABS	Laval, Canada Veszprem, HU	(450) 973-2240 (416) 815-0700	<a href="http://www.preclin.com">www.preclin.com</a> www.trc.hu	Yes	X X	X X	X X	X X		X			X X			X X		
Liberty Research	Waverly, NY	(607) 565-8131 (p) (607) 565-7420 (f)	NO	Cats, Ferrets			X											

# TOXICOLOGY LAB LISTINGS (Cont.)

Lab	Location	Phone #	Website	Additional Services	Rat	Rabbits	Dog	Carcinogen idity	DART	Inhalation	Primate	Pig	IV Infusion	Genotoxic	Devices	Metabolism	Analytical	Special Studies	
Lovelace	Albuquerque, NM	(505) 348-9456	www.lrri.org	Clinical						X									
LPT	Hamburg, GE	40-70-20-20 40-70-20-22-99	www.LPT-pharm-tox.de		X	X	X	X	X	X	X	X	X	X	X	X	X	X	SP
LyChron	Mountain View, CA	650-938-3675	www.lychron.com	Pig Device Implant Studies								X							
Maccine	Singapore	+65-6778-7305	<a href="http://www.maccine.com">www.maccine.com</a>	Yes	X	?	?			?			X			X	X		
MB Research	Spinnerstown, PA	(215) 536-4110	www.mbresearch.com	In vitro and alternative models	X	X	X								X				
MDS Pharma Services	Lincoln, NE L'Arbresle, France Geneva, Switzerland	(514) 333-0033	www.mdsp.com	Clinical, receptor screening	X	X	X	X	X		X			X	X	X	X	X	SP SP
MicaGenix	Greenfield, IN	888-779-5500	www.micagenix.com	Histology Image analysis Non-GLP mice & rats										X					
Micro Test	Agawam, MA	(800) 631-1680	www.microtestlabs.com	Yes											X				
Midwest Bio Research	Evanston, IL	847-682-6141(p) 847-556-6560(f)	www.midwestbioresearch.com	consultation										X		X			
MPI	Mattawan, MI	(269) 668-3336	www.mpiresearch.com	Yes	X	X	X	X	X		X	X	X		X	X	X	X	SP
MSI	Minato-ku, Tokyo, Japan	81 3 3454 7571	www.ankaken.co.jp	Yes				X		X	X					X			
MWRI	Kansas City, MO	(816) 753-7600	www.mriresearch.org	Yes	X			X											
NAMSA	Toledo, OH Irvine, CA Kennesaw, GA	(419) 666-9455 (949) 951-3110 (770) 427-3101	www.namsa.com	Yes										X X	X X				
Nelson Labs	Salt Lake City, UT	(800) 826-2088	www.nelsonlabs.com	Yes											X		X		
Next Century, INC	Newark, Delaware	(302) 453-0571	www.nextcenturyinc.com	Yes	X	X	X	X		X	X	X	X		X				
Northern Biomedical Research	Muskegon, MI	(231) 759-2333		Yes, Surgery, Large animals	X	X	X				X	X	X			X			
Northview	Northbrook, IL Spartan, SC	(847) 564-8181 (864) 574-7728	www.northviewlabs.com	Yes											X				
NOTOX	s'Hertogenbosch the Netherlands	31 73 640 67 00 (p) 31 73 640 67 99 (f)	www.notox.nl	Yes, Birds, +	X	X	X	X	X			X	X	X	X	X			WL

# TOXICOLOGY LAB LISTINGS (Cont.)

Lab	Location	Phone #	Website	Additional Services	Rat	Rabbits	Dog	Carcinogenicity	DART	Inhalation	Primate	Pig	IV Infusion	Genotoxic	Devices	Metabolism	Analytical	Special Studies	
Nucro-Technics	Ontario, Canada	(416) 438-6727 (p) (416) 438-3463 (f)	www.nucro-technics.com	Microbiology	X	X	X	X						X	X		X		
Pacific Biolabs (PBL)	Hercules, CA	(510) 694-9000	www.northviewlabs.com	Yes	X	X	X	X	X					X	X	X	X		
Perry Scientific	San Diego, CA	(858) 560-9000 (p) (858) 467-9608 (f)	www.perryscientific.com	Yes; Large animals	X	X	X	X	X			X	X		X	X	X	SP	
Porsolt & Partners	Boulogne-Billancourt, FRANCE	+33146109990	<a href="http://www.porsolt.com/">http://www.porsolt.com/</a>	Yes	X	X	X				X		X			X	X		
Product Safety Labs	Dayton, NJ	(732) 438-5100 (732) 254-9200	www.productsafetylabs.com	Environmental, Ferret Emesis Studies	X	X		X	X	X			X	X	X		X	WL	
Provident Preclinical, Inc	Doylestown, PA	215-348-3868(p) 215-348-5081(f)	www.ppicro.com	Yes	X	X	X	X		X	X	X			X				
Quest	Newark, Delaware	(302) 369-5601	www.questpharm.com	Yes	X	X	X		X		X			X		X	X		
Rallis Research Center	Bangalore, India	+91-80-28394959 +91-80-28394015	www.rallis.co.in	Yes	X	X		X						X		X	X		
RCC Ltd.	Zelgliweg 1 CH-4452 Itegen Switzerland	(410) 385-1666 – US sales office +41 61 975 1111 (p)	www.rcc.ch	Consulting, regulatory	X	X	X	X	X	X		X	X	X	X	X	X	X	SP
Ricerca	Concord, OH	(888) 763-4797	www.ricerca.com	*Synthesis, product development	X	X	X	X	X	X						X	X		
RTC S.p.A.	Via Tito Speri 12 I-40 Pomezia (Rom) Italy	+39 06 910 951 (p) +39 06 910 5737 (f)	www.rtc.it	Yes, Consulting, Regulatory	X	X	X	X	X			X		X				SP WL	
RTI	RTP, NC	(919) 541-6000	www.rti.org	Yes	X			X	X								X	X	
SafePharm	Derby, UK	00 44 (0) 1332 792896	www.safepharm.com	Yes, (fish+)	X			X	X	X				X	X	X	X	SP	
SCANTOX	Hestehavevej 36a DK-4623 Lille Skensved, Denmark	+45 56 82 11 00 (p) +45 56 82 12 02 (f)	www.scantox.com		X	X	X	X	X	X		X	X	X	X				
Sequani Limited	Bromyard Road Herefordshire HR8 1LH Ledbury, U.K.	+44 1531 634121 (p) +44 1531 634753 (f)	www.sequani.com		X	X	X	X	X			X	X	X	X				

# TOXICOLOGY LAB LISTINGS (Cont.)

Lab	Location	Phone #	Website	Additional Services	Rat	Rabbits	Dog	Carcinogen idity	DART	Inhalation	Primate	Pig	IV Infusion	Genotoxic	Devices	Metabolism	Analytical	Special Studies
SGS Life Sciences Division	Fairfield, NJ	(800) 747-8782	www.ustesting.sgsna.com	Implant, combustion, fish, industrial, consumer products	X	X		X						X	X		X	SP, WL
Sinclair	PO Box 658	573-387-4400	www.sinclairresearch.com	Radiolabeled; cats; other				X				X	X		X	X		
Sitek	Rockville, MD	(301) 926-4900	www.siteklabs.com	Yes	X									X	X	X		
Skeletech	Bothell, WA	(425) 424-2663	www.skeletech.com	*Bone, CNS	X	X	X				X	X	X		X			
SNBL	Kagoshima, Japan	81 (0) 99-294-2600 81 (0) 99-294-3196 (f)	www.snbl.com	Yes, Clinical, +, Irritation`	X	X	X	X	X		X	X	X	X	X			SP
SNBL USA Ltd.	6605 Merrill Creek Parkway Everett, WA 98203	(425) 407 0121 (p) (425) 407 8601 (f)	http://www.snblusa.com/	Formulation, ferrets	X	X		X	X	X	X		X				X	SP
Southern RI	Birmingham, AL	(888) 322-1166	www.southernreaserch.org	Yes, formulation, development, tumor models	X	X	X	X	X		X	X	X	X	X	X	X	SP
SP1-bio	France	33 (0) 169 53 14 00	www.spibio.com	Clinical	X											X	X	
Spring Valley Lab.	Woodbine, MD	(800) 864-1839	www.springvalleylabs.com	Ferrets	X	X		X	X						X			
SRI	Palo Alto, CA	(650) 859-2000 866-451-5998	www.sri.com	Formulation, CTM	X	X	X	X				X		X	X	X	X	
Stillmeadow Inc.	Sugarland, TX	(281) 240-8828	www.stillmeadow.com	Companion animal studies	X	X	X			X		X					X	
STS duo Tek	Rush, NY He nrietta, NY	(716) 321-1130 (800) 836-4850	www.stsduotek.com	Yes, ocular	X	X							X	X	X			
Tandem Labs	Ewing, NJ	(609) 434-0044	www.tandemlabs.com	Yes													X	
TNO Pharma	Utrechtseweg 48 NL-3700AJ Zeist 3704 HE The Netherlands	+31 30 694 4806 (p) +31 30 694 4845 (f)	www.voeding.tno.nl	Yes, packaging, food & nutrition, clinical	X	X	X	X	X	X	X	X	X	X	X	X	X	SP, WL
Torrent Pharmaceutica ls Ltd.	Gujarat, India		<a href="http://www.torrentpharma.com">www.torrentpharma.com</a>					X	X					X				
TOXIKON Corp.	15 Wiggins Ave. Bedford, MA 01730	(781) 275 3330 (p) (781) 271-1136 (f)	www.toxikon.com	Yes	X	X	X	X	X			X	X	X	X	X		WL

# TOXICOLOGY LAB LISTINGS (Cont.)

Lab	Location	Phone #	Website	Additional Services														
					Rat	Rabbits	Dog	Carcinogen idiv	DART	Inhalation	Primate	Pig	IV Infusion	Genotoxic	Devices	Metabolism	Analytical	Special Studies
UIC Tox Research Lab	Chicago, IL	(312) 996-2123	www.uic.edu/labs/tox	Yes	X	X	X		X	X	X		X			X	X	
Vivo Bio Tech, Ltd.	Hyderabad, India	92-40-55784714 (p) 91-40-55776112 (f)	www.vivobio.com	immuno-deficient mice	X	X			X					X		X		
VIZON SciTec	Vancouver, BC CANADA	604-224-4331	www.vizonscitech.com	Ecotox														
VIMTA	Hyderabad, India	+91-40-2726 4141	www.vimta.com	Clinical					X					X			X	
WIL Research Labs, Inc.	1407 George Rd. Ashland, OH 44805	(419) 289 8700 (p) (419) 289 3650 (f)	www.wilresearch.com	Yes	X	X	X	X	X	X	X	X	X			X	X	SP, WL
XenoBiotics	Plainsboro, NJ	(609) 799-2295 (609) 799-7497	www.xbl.com	Clinical	X	X	X									X		
Xenotech	Lenexa, Kansas	(913) 438-7450	www.xenotech.com	Yes												X		

- A “Yes” or “+” listed in the additional services column indicates that there are more services available than just those listed.
- SP in the special studies column indicates safety pharmacology, WL in this column indicates wildlife/ environmental testing is available, EN in this column indicates that environmental testing in available.
- \* Limited

<sup>a</sup> Hamster carcinogenicity is available