

2020

Testing and Toxicology Studies in FY 2020

APPENDIX II

The NTP testing program evaluates substances for a variety of health-related effects, generally using rodent models. For each test article, a study team develops an appropriate testing strategy to address the identified research needs. Reports and summaries of NTP toxicity studies, including carcinogenicity and effects on development and reproduction, are available on the NTP website. Studies initiated, ongoing, or completed in 2020 are listed in this appendix.

Disposition, Metabolism, and Toxicokinetic Studies

Complete dosimetry of a chemical or physical agent describes its absorption, distribution, metabolism, and excretion in the body of both humans and test animals at differing levels of exposure, of all ages, via several routes of exposure, and under varying genetic backgrounds. Substances evaluated during FY 2020 are listed below.

Disposition, Metabolism, and Toxicokinetic Studies during FY 2020

Test Article	CASRN*	Species	Route	Status	Study Scientist
2-((1-(4-Phenoxyphenoxy)propan-2-yl)oxy)pyridine	95737-68-1	Rats; rabbits	Gavage	Ongoing	Barry McIntyre
Alpha-Pinene	80-56-8	Rats, mice	Inhalation	Ongoing	Cynthia Rider
Bisphenol AF	1478-61-1	Rats, mice	Gavage, intravenous	Completed	Vicki Sutherland
		Rats, mice	Dosed-feed	Completed	Suramya Waidyanatha
Ginkgo biloba extract	90045-36-6	Rats	Gavage	Ongoing	Suramya Waidyanatha
Microcystin LR	101043-37-2	Rats, mice	Gavage, intravenous	Ongoing	Suramya Waidyanatha
NTP systematic evaluation of the application of zebrafish in toxicology	N/A	Fish	N/A	Ongoing; Initiated	Kristen Ryan
Phenolic benzotriazoles (2-(2H-benzotriazol-2-yl)-4,6-bis (1-methyl-1-phenylethyl)phenol)	70321-86-7	Rats	Gavage, intravenous	Ongoing	Suramya Waidyanatha
Phenolic benzotriazoles (2-(2H-benzotriazol-2-yl)-4,6-bis (1,1-dimethylpropyl)phenol)	25973-55-1	Rats	Gavage, intravenous	Ongoing	Suramya Waidyanatha
Phenolic benzotriazoles (2-(2H-Benzotriazol-2-yl)-4-tert-butylphenol)	3147-76-0	Rats	Gavage, intravenous	Ongoing	Suramya Waidyanatha
Phenolic benzotriazoles (2-(2H-Benzotriazol-2-yl)phenol)	10096-91-0	Rats	Gavage, intravenous	Ongoing	Suramya Waidyanatha
Phenolic benzotriazoles (2-(5-Chloro-2H-benzotriazol-2-yl)-4,6-bis (1,1-dimethylethyl)phenol)	3864-99-1	Rats	Gavage, intravenous	Ongoing	Suramya Waidyanatha
Phenolic benzotriazoles (3-(2H-Benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxybenzenepropanoic acid, octyl ester)	84268-23-5	Rats	Gavage, intravenous	Ongoing	Suramya Waidyanatha
Phenolic benzotriazoles (Bumetizole)	3896-11-5	Rats	Gavage, intravenous	Ongoing	Suramya Waidyanatha

Test Article	CASRN *	Species	Route	Status	Study Scientist
Phenolic benzotriazoles (Drometrizole)	2440-22-4	Rats	Gavage, intravenous	Ongoing	Suramya Waidyanatha
Phenolic benzotriazoles (Octrizole)	3147-75-9	Rats	Gavage, intravenous	Ongoing	Suramya Waidyanatha
Polyethylene glycols, high molecular weight	9004-74-4	Rats	Subcutaneous injection	Ongoing	Jia-Long Fang
Sodium arsenite	7784-46-5	Rats	Gavage	Ongoing	Daniel Doerge
		Monkeys	Dosed-feed	Ongoing	Daniel Doerge
		Mice	Dosed-water	Ongoing	Daniel Doerge

*CASRN = Chemical Abstracts Service Registry Number.

Genetic Toxicity Studies

Genetic toxicity test results are used to help interpret general toxicity, carcinogenicity, or other in vivo test results and to provide a database for use in structure-activity relationship analysis. Substances evaluated during FY 2020 are listed below.

Genetic Toxicity Studies in FY 2020

Test Article	CASRN*	Species/Cell Line	Testing Battery	Status	Study Scientist
(Aminomethyl)phosphonic acid	1066-51-9	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
1,2-Bis(2,4,6-tribromophenoxy)ethane	37853-59-1	TK6 cells	Comet assay	Ongoing	Kristine Witt
1,2-bis(pentabromophenyl)ethane	84852-53-9	Salmonella	Salmonella	Completed	Kristine Witt
		TK6 cells	Comet assay	Completed; Initiated	Kristine Witt
1,3,5,7,9,11-Hexabromocyclododecane	25637-99-4	TK6 cells	Comet assay	Ongoing; Initiated	Kristine Witt
1H-Isoindole-1,3(2H)-diimine	3468-11-9	Salmonella	Salmonella	Completed	Kristine Witt
		TK6 cells	Micronucleus	Completed	Kristine Witt
2-(Thiocyanomethylthio)benzothiazole	21564-17-0	Salmonella	Salmonella	Completed	Kristine Witt
		TK6 cells	Micronucleus	Completed	Kristine Witt
2,2',4,4'-Tetrabromodiphenyl Ether	5436-43-1	TK6 cells	Comet assay	Ongoing	Kristine Witt
2-Chloro-N-(2-methyl-4-bromophenyl)acetamide	96686-51-0	Salmonella	Salmonella	Completed	Kristine Witt
		TK6 cells	Micronucleus	Completed	Kristine Witt
2-Ethylhexyl-2,3,4,5-tetrabromobenzoate	183658-27-7	Salmonella	Salmonella	Ongoing	Kristine Witt
		TK6 cells	Comet assay	Ongoing	Kristine Witt
2-Ethyltoluene	611-14-3	Rats, mice	Micronucleus	Completed	Kristine Witt
2-Hydroxy-4-methoxybenzophenone	131-57-7	Salmonella	Salmonella	Completed	Kristine Witt
4-(Hexyloxy)phenol	18979-55-0	Salmonella	Salmonella	Completed	Kristine Witt
		TK6 cells	Micronucleus	Completed	Kristine Witt
Alpha-Pinene	80-56-8	Salmonella	Salmonella	Completed	Kristine Witt
Alpha-Pinene oxide	1686-14-2	Salmonella	Salmonella	Completed	Kristine Witt
Benzo(a)pyrene	50-32-8	Rats	Pig-a gene mutation; comet assay	Ongoing	Kristine Witt
Bisphenol S	80-09-1	Rats	Micronucleus	Completed	Kristine Witt

Test Article	CASRN*	Species/Cell Line	Testing Battery	Status	Study Scientist
Black cohosh	84776-26-1	TK6 cells	Micronucleus	Completed	Stephanie Smith-Roe
Buccaneer Plus	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
	N/A	Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Cornerstone Plus	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Decabromodiphenyl ether	1163-19-5	TK6 cells	Comet Assay	Ongoing	Kristine Witt
Deionized water	N/A	Mice	Micronucleus	Ongoing	Kristine Witt
Deoxynivalenol	51481-10-8	Rats	Micronucleus	Completed	Kristine Witt
Dipentaerythritol pentaacrylate	60506-81-2	Salmonella	Salmonella	Completed	Kristine Witt
		TK6 cells	Micronucleus	Completed	Kristine Witt
Dipyriithione	3696-28-4	Salmonella	Salmonella	Completed	Kristine Witt
		TK6 cells	Micronucleus	Completed	Kristine Witt
Diquat dibromide monohydrate	6385-62-2	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Durango DMA	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Echinacea purpurea root extract	90028-20-9	Rats	Micronucleus	Completed	Kristine Witt
Garcinia cambogia extract	90045-23-1	Rats, Mice	Micronucleus	Completed	Kristine Witt
Glyphosate	1071-83-6	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Glyphosate isopropylamine salt	38641-94-0	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Glystar Plus	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Hallex GT	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe

Test Article	CASRN*	Species/Cell Line	Testing Battery	Status	Study Scientist
Hexachlorocyclopentadienyl-dibromocyclooctane	51936-55-1	Salmonella	Salmonella	Completed	Kristine Witt
		TK6 cells	Comet assay	Ongoing	Kristine Witt
Hi-Yield® KILLZALL™ II	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Mesotrione	104206-82-8	TK6 cells	Micronucleus	Completed; Ongoing	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Methylcellulose	9004-67-5	Mice	Micronucleus	Ongoing	Kristine Witt
Metolachlor	51218-45-2	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Microcystin LR	101043-37-2	Mice	Micronucleus; pig-a gene mutation	Completed	Kristine Witt
		Rats	Micronucleus	Completed	Kristine Witt
N-Ethyl-N-nitrosourea	759-73-9	Rats	Comet assay	Completed; Ongoing	Kristine Witt
		Rats	Pig-a gene mutation	Completed	Kristine Witt
Potassium dicyanoaurate	13967-50-5	Salmonella	Salmonella	Completed	Kristine Witt
		TK6 cells	Micronucleus	Completed	Kristine Witt
Remuda® Full Strength	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Roundup® Custom	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Roundup PowerMAX®	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Roundup WeatherMAX®	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Roundup® Concentrate Plus	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe

Test Article	CASRN *	Species/Cell Line	Testing Battery	Status	Study Scientist
Roundup® Super Concentrate	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Sodium metavanadate	13718-26-8	Rats, Mice	Comet Assay	Ongoing	Kristine Witt
Tetrabromobisphenol A-bis(2,3-dibromopropyl ether)	21850-44-2	TK6 cells	Comet assay	Ongoing	Kristine Witt
Thallium (I) sulfate	7446-18-6	Rats, Mice	Micronucleus	Ongoing	Kristine Witt
		Rats, Mice	Pig-a gene mutation	Ongoing	Kristine Witt
Touchdown Total®	N/A	TK6 cells	MultiFlow, micronucleus	Completed	Stephanie Smith-Roe
		Salmonella	Salmonella	Completed	Stephanie Smith-Roe
Triclosan	3380-34-5	Rats	Micronucleus	Completed	Kristine Witt
Tricombination FTC:TDF:EFV (1:1.5:3)	N/A	Mice	Micronucleus	Completed	Kristine Witt
Tricombination ABC:DTG:3TC	N/A	Rats	Micronucleus	Completed;	Kristine Witt
Tris(4-chlorophenyl)methane	27575-78-6	Rats	Micronucleus	Completed	Kristine Witt
Vanadyl sulfate	27774-13-6	Rats, Mice	Comet assay	Ongoing	Kristine Witt

Organ Systems Toxicity Studies

NTP studies toxicity of environmental substances on development, reproduction, and on the nervous and immune systems. Organ systems toxicity studies conducted during FY 2020 are listed below.

Neurotoxicity, Developmental Toxicity, and Reproductive Toxicity Studies during FY 2020

Test Article	CASRN *	Species	Testing Battery	Length	Route	Status	Study Scientist
1020 Long multiwalled carbon nanotube	N/A	Rats	Immunotoxicity	30 days	Inhalation	Ongoing	Nigel Walker
		Mice	Immunotoxicity	30 days, 90 days	Inhalation	Ongoing	Dori Germolec
2-((1-(4-Phenoxy-phenoxy)propan-2-yl)oxy)pyridine	95737-68-1	Rats	Immunotoxicity	28 days	Gavage	Ongoing	Dori Germolec
		Rats	Conventional teratology	GD 6 to GD 21	Gavage	Ongoing	Barry McIntyre
		Rabbits	Conventional teratology, teratology pilot studies	GD 7 to GD 28	Gavage	Ongoing	Barry McIntyre
2,3-Butanedione	431-03-8	Mice	Immunotoxicity	28 days	Inhalation	Completed	Dori Germolec
3,3',4,4'-Tetrachloro-azobenzene	14047-09-7	Rats	Immunotoxicity	28 days	Gavage	Completed	William Gwinn
4-Methylcyclohexanemethanol (MCHM)	34885-03-5	Mice	Immunotoxicity	7 days	Topical application	Completed	Chad Blystone
		Rats	Teratology pilot studies, conventional teratology	GD 6 to GD 20	Gavage	Completed	Chad Blystone
4-Methylimidazole	822-36-6	Rats	Continuous breeding	M: 10 weeks prior to cohabitation; F: 2 weeks prior to cohabitation; M&F: during cohabitation; F: during gestation, delivery and up to PND 4; continuous	Dosed-feed	Ongoing	Mamta Behl
Acenaphthenequinone	82-86-0	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Cynthia Rider
Arsenic	7440-38-2	Rats	Developmental toxicity	Pregnant dams through PND 21; N/A	Gavage & dosed-water	Ongoing	Stephen Ferguson
Benz(j)aceanthrylene	202-33-5	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Dori Germolec

Test Article	CASRN *	Species	Testing Battery	Length	Route	Status	Study Scientist
Benzo(a)pyrene	50-32-8	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Cynthia Rider
Benzo(b)fluoranthene	205-99-2	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Dori Germolec
Benzo(c)fluorene	205-12-9	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Dori Germolec
Benzo(k)fluoranthene	207-08-9	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Dori Germolec
Bisphenol AF	1478-61-1	Rats	Developmental immunotoxicity	GD 6 to PND 96	Dosed-feed	Ongoing	Dori Germolec
Black cohosh	84776-26-1	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Chad Blystone
		Rats	Continuous breeding	N/A	Gavage	Ongoing	Mimi Huang
Butyl paraben	94-26-8	Rats	Continuous breeding; maternal transfer	N/A	Dosed-feed	Completed	Chad Blystone
Chrysene	218-01-9	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Dori Germolec
Crude 4-methylcyclohexanemethanol	34885-03-5	Mice	Immunotoxicity	7 days	Topical application	Completed	Scott Auerbach
Dibenz(a,h)anthracene	53-70-3	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Cynthia Rider
Dibenzo(a,l)pyrene	191-30-0	Mice	Immunotoxicity	28 days	Gavage	Ongoing; Initiated	Dori Germolec
Dibenzothiophene	132-65-0	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Dori Germolec
Diisobutyl phthalate	84-69-5	Rats	Continuous breeding	Continuous	Dosed-feed	Ongoing	Chad Blystone
DMAE bitartrate	5988-51-2	Rats	Teratology pilot studies, conventional teratology	GD 6 to GD 20	Gavage	Completed	Vicki Sutherland
Echinacea purpurea root extract	90028-20-9	Rats	Immunotoxicity	28 days	Gavage	Ongoing	Dori Germolec
Effective dose producing 10% response PAC mixture	N/A	Mice	Immunotoxicity	28 days	Gavage	Initiated	Dori Germolec
Effective dose producing 50% response PAC mixture	N/A	Mice	Immunotoxicity	28 days	Gavage	Initiated	Dori Germolec
Equimolar PAC mixture	N/A	Mice	Immunotoxicity	28 days	Gavage	Initiated	Dori Germolec
Gum guggul extract	N/A	Mice	Immunotoxicity	28 days	Gavage	Completed	Dori Germolec

Test Article	CASRN *	Species	Testing Battery	Length	Route	Status	Study Scientist
Indeno(1,2,3-cd) pyrene	193-39-5	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Dori Germolec
Nanoscale material (fullerene-C60 1 micron; fullerene-C60 50 nanometers)	99685-96-8	Rats, Mice	Immunotoxicity	N/A	Inhalation	Completed	Nigel Walker
Nanoscale material (fullerene-C60 50 nanometers)	99685-96-8	Rats, Mice	Immunotoxicity	N/A	Inhalation	Completed	Nigel Walker
N-Butylbenzenesulfonamide	3622-84-2	Mice	Immunotoxicity	28 days	Dosed-feed	Ongoing	Dori Germolec
		Rats	Developmental immunotoxicity	GD 6 to PND 42	Dosed-feed	Ongoing	Dori Germolec
Nelfinavir mesylate	159989-65-8	Mice	Immunotoxicity	28 days	Gavage	Completed	Dori Germolec
Phenanthrene	85-01-8	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Cynthia Rider
Pyrene	129-00-0	Mice	Immunotoxicity	28 days	Gavage	Ongoing	Cynthia Rider
Resveratrol	501-36-0	Mice	Immunotoxicity	28 days, 180 days	Gavage	Ongoing	Dori Germolec
Sodium metavanadate	13718-26-8	Mice	Immunotoxicity	28 days	Dosed-water	Ongoing	Georgia Roberts
Sodium tungstate dihydrate	10213-10-2	Mice	Immunotoxicity	28 days	Dosed-water	Ongoing	Dori Germolec
Sulfolane	126-33-0	Rats, Mice	Immunotoxicity	13 weeks	Gavage	Ongoing	Dori Germolec, Chad Blystone
Tenofovir disoproxil fumarate (TDF)	202138-50-9	Mice	Teratology pilot studies	GD 5 to PND 21	Gavage	Ongoing	Barry McIntyre
Tricombination FTC:TDF:EFV (1:1.5:3)	N/A	Mice	Teratology pilot studies; maternal transfer	GD 5 to GD 15	Gavage	Ongoing	Vicki Sutherland
Tris(Chloropropyl) phosphate (TCPP)	13674-84-5	Rats	Teratology pilot studies, conventional teratology	GD 6 to GD 20	Gavage	Completed	Kristen Ryan
		Rats	Developmental immunotoxicity	GD 6 to PND 127	Dosed-feed	Ongoing	Dori Germolec
Vinclozolin	50471-44-8	Rats	Continuous breeding	9 months	Gavage	Completed	Barry McIntyre
Vinpocetine	42971-09-5	Rats	Teratology pilot studies, conventional teratology	GD 6 to GD 20	Gavage	Completed	Vicki Sutherland
		Rabbits	Teratology pilot studies	GD 7 to GD 28	Gavage	Completed	Vicki Sutherland

*CASRN = Chemical Abstracts Service Registry Number.

Modified One-Generation Reproduction Studies

NTP modified one-generation study design emphasizes a full evaluation of the first-generation offspring of animals and uses fewer animals than the classical multigenerational study design. These studies generate information on the effects of substances on prenatal development, postnatal development, and reproduction. Ongoing and completed modified one-generation studies are listed below.

Modified One-Generation Studies in FY 2020

Test Article	CASRN*	Species	Testing Battery	Status	Study Scientist
2,2'-Dimorpholinodiethyl ether	6425-39-4	Rats	Dose range finding	Ongoing	Georgia Roberts
2-Ethylhexyl p-methoxycinnamate	5466-77-3	Rats	Dose range finding; developmental toxicity, F0 generation, fertility assessment, subchronic	Ongoing	Barry McIntyre
2-Hydroxy-4-methoxybenzophenone	131-57-7	Rats	Dose range finding; developmental toxicity, F0 generation, fertility assessment	Ongoing	Barry McIntyre
Bisphenol AF	1478-61-1	Rats	Dose range finding, developmental toxicity, F0 generation, fertility assessment, maternal transfer, subchronic	Ongoing	Vicki Sutherland
Bisphenol S	80-09-1	Rats	Dose range finding; F0 generation	Completed	Vicki Sutherland
Boric acid	10043-35-3	Rats	Dose range finding	Completed	AtLee Watson, Shannah Witchey
		Rats	F0 generation	Ongoing	AtLee Watson, Shannah Witchey
Deoxynivalenol	51481-10-8	Rats	Dose range finding	Ongoing	Dori Germolec
Echinacea purpurea root extract	90028-20-9	Rats	Dose range finding; conventional teratology; fertility assessment; subchronic	Ongoing	Kristen Ryan
Isopropylated phenol phosphate	68937-41-7	Rats	Dose range finding	Ongoing	Mamta Behl
Microcystin LR	101043-37-2	Mice	Dose range finding	Completed	Vicki Sutherland
N-Butylbenzenesulfonamide	3622-84-2	Rats	Developmental toxicity, F0 generation, fertility assessment; maternal transfer; neurotoxicology assessment; subchronic	Ongoing	Cynthia Rider
Resveratrol	501-36-0	Rats	Developmental toxicity, F0 generation, fertility assessment	Ongoing	Dori Germolec
Simvastatin	79902-63-9	Rats	Dose range finding	Completed	Barry McIntyre
Triclosan	3380-34-5	Rats	Dose range finding	Ongoing	Vicki Sutherland
Tricombination FTC:TDF:EFV (1:1.5:3)	N/A	Mice	F0 generation; subchronic; maternal transfer	Ongoing	Vicki Sutherland

Test Article	CASRN*	Species	Testing Battery	Status	Study Scientist
Tricombination ABC:DTG:3TC	N/A	Rats	Subchronic; maternal transfer	Initiated	Vicki Sutherland
		Rats	Dose range finding	Ongoing	Vicki Sutherland
Triphenyl phosphate	115-86-6	Rats	Dose range finding	Ongoing	Mamta Behl
Tris (4-chlorophenyl) methane	27575-78-6	Rats	Dose range finding	Ongoing	Nigel Walker
Valerian (<i>Valeriana officinalis</i> L.) root extract	8057-49-6	Rats	Dose range finding	Ongoing	Georgia Roberts

*CASRN = Chemical Abstracts Service Registry Number.

Toxicity and Carcinogenicity Studies

NTP performs toxicity studies to provide dose-setting information for chronic studies and to address specific deficiencies in the toxicology database for the chemical. Toxicology and carcinogenicity studies fall into two categories: prechronic toxicity studies and chronic two-year toxicology and carcinogenicity studies. Studies are generally conducted in rats and mice.

Each study type is performed according to the Specifications for the Conduct of Studies to Evaluate the Reproductive and Developmental Toxicity of Chemical, Biological, and Physical Agents in Laboratory Animals for the National Toxicology Program (NTP) (May 2011). Prechronic and chronic toxicity studies and carcinogenicity studies that were initiated, ongoing, or completed during FY 2020 are listed below.

Prechronic Toxicity and Carcinogenicity Studies in FY 2020

Test Article	CASRN *	Species	Length	Route	Status	Study Scientist
1,1,2,2-Tetrahydroperfluoro-1-dodecanol	865-86-1	Rats	5 days	Gavage	Initiated	Scott Auerbach
1,2,4-Trimethylbenzene	95-63-6	Rats, Mice	13 weeks	Inhalation	Ongoing	Kristen Ryan
1,2-Bis(2,4,6-tribromophenoxy)ethane	37853-59-1	Rats	5 days	Gavage	Ongoing	June Dunnick
1,2-Bis(pentabromophenyl)ethane	84852-53-9	Rats	5 days	Gavage	Ongoing	June Dunnick
1,3,5,7,9,11-Hexabromocyclododecane	25637-99-4	Rats	5 days	Gavage	Ongoing	June Dunnick
1020 Long multiwalled carbon nanotube	N/A	Rats, mice	30 days	Inhalation	Completed	Nigel Walker
		Rats, mice	30 days, 2 years	Inhalation	Ongoing	Nigel Walker
2,2',4,4'-Tetrabromodiphenyl ether	5436-43-1	Rats	5 days	Gavage	Ongoing	June Dunnick
2,2'-Dimorpholinodiethyl ether	6425-39-4	Mice	28 days	Gavage	Ongoing	Georgia Roberts
2,3-Benzofluorene	243-17-4	Rats	5 days	Gavage	Initiated	Scott Auerbach
2,3-Pentanedione	600-14-6	Rats, mice	90 days	Inhalation	Ongoing	Nigel Walker
2-ethylhexyl-2,3,4,5-tetrabromobenzoate	183658-27-7	Rats	5 days	Gavage	Ongoing	June Dunnick
2-ethyltoluene	611-14-3	Rats, mice	3 months	Inhalation	Initiated	Mimi Huang
		Rats, mice	2 weeks	Inhalation	Ongoing	Mimi Huang
2-Hydroxy-4-methoxybenzophenone	131-57-7	Rats, mice	2 years	Dosed-feed	Completed	Barry McIntyre

Test Article	CASRN *	Species	Length	Route	Status	Study Scientist
3,3',4,4'-Tetrachloroazobenzene	14047-09-7	Rats	5 days	Gavage	Ongoing	William Gwinn
4-Methylcyclohexanemethanol (MCHM)	34885-03-5	Rats	5 days	Gavage	Completed	Scott Auerbach
6:1 Fluorotelomer alcohol	375-82-6	Rats	5 days	Gavage	Initiated	Scott Auerbach
Abrasive blasting agents (coal slag)	N/A	Rats	14 days	Inhalation	Completed	William Gwinn
Abrasive blasting agents (crushed glass)	N/A	Rats	14 days	Inhalation	Completed	William Gwinn
Abrasive blasting agents (garnet)	N/A	Rats	14 days	Inhalation	Completed	William Gwinn
Abrasive blasting agents: blasting sand	N/A	Rats	14 days, 39 weeks	Inhalation	Completed	William Gwinn
Abrasive blasting agents: specular hematite	N/A	Rats	14 days, 39 weeks	Inhalation	Completed	William Gwinn
Acetaminophen (4-hydroxyacetanilide)	103-90-2	Rats	90 days	Gavage	Ongoing	Vicki Sutherland
Acrylamide	79-06-1	Rats	5 days	Gavage	Ongoing	William Gwinn
Aging cohort study: 12951/SvlmJ mouse	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Aging cohort study: A/J mouse	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Aging cohort study: B6C3F1J mouse	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Aging cohort study: C3H/HeJ mouse	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Aging cohort study: C57/BL/6J mouse	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Aging cohort study: CAST/EiJ mouse	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Aging cohort study: NOD.B10Sn-H2(b)/J	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Aging cohort study: NZO/HlLtJ mouse	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Aging cohort study: PWK/PhJ mouse	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Aging cohort study: WSB/EiJ mouse	N/A	Mice	2 years	N/A	Ongoing	June Dunnick
Alpha/beta Thujone mixture	76231-76-0	Rats	5 days	Gavage	Ongoing	William Gwinn
Alpha-Pinene	80-56-8	Rats, mice	7 days, 2 years	Inhalation	Ongoing	Cynthia Rider
		Rats	90 days	Inhalation	Ongoing	Cynthia Rider
Aqueous film forming foams	N/A	Rats	14 days	Gavage	Initiated	Mimi Huang

Test Article	CASRN *	Species	Length	Route	Status	Study Scientist
Arsenic	7440-38-2	Rats, mice	Acute	Gavage & dosed-water	Ongoing	Daniel Doerge
		Monkeys	Acute	N/A	Ongoing	Daniel Doerge
Aspergillus fumigatus mold	N/A	Mice	13 weeks	Inhalation	Ongoing	Dori Germolec
Bis(2-ethylhexyl) tetrabromophthalate	26040-51-7	Rats	5 days	Gavage	Ongoing	June Dunnick
Bisphenol AF	1478-61-1	Rats	5 days	Gavage	Ongoing	William Gwinn
Bisphenol S	80-09-1	Mice	14 days	Dosed-feed	Ongoing	Vicki Sutherland
Black cohosh	84776-26-1	Rats, mice	2 years	Gavage	Ongoing	Chad Blystone
		Rats	14 days, N/A	Gavage	Ongoing	Chad Blystone
Brominated vegetable oil	8016-94-2	Rats	90 days	Dosed-feed	Ongoing	Goncalo Gamboa da Costa
Cell phone radiation: CDMA	N/A	Mice	5 days	Whole-body exposure	Initiated	Michael Wyde
Coumarin	91-64-5	Rats	5 days	Gavage	Ongoing	June Dunnick
Crude MCHM	N/A	Rats	5 days	Gavage	Completed	Scott Auerbach
Decabromodiphenyl ether	1163-19-5	Rats	5 days	Gavage	Ongoing	June Dunnick
Di(2-ethylhexyl) phthalate	117-81-7	Rats	Perinatal + 2 years, 2 years	Dosed-feed	Ongoing	Troy Hubbard
		Rats	5 days	Gavage	Ongoing	William Gwinn
Dibutyl phthalate	84-74-2	Rats, mice	2 years	Dosed-feed	Ongoing	Mimi Huang
Dimethylamine borane	74-94-2	Rats, mice	2 weeks	Dermal	Ongoing	AtLee Watson, Rachel Frawley
Ethinyl estradiol	57-63-6	Rats	5 days	Gavage	Ongoing	William Gwinn
Fenofibrate	49562-28-9	Rats	5 days	Gavage	Ongoing	William Gwinn
Furan	110-00-9	Rats	5 days	Gavage	Ongoing	William Gwinn
Garcinia cambogia extract	90045-23-1	Rats, mice	14 days, 13 weeks	Dosed-feed	Ongoing	Cynthia Rider
Ginkgo biloba extract	90045-36-6	Rats	5 days	Gavage	Ongoing	Scott Auerbach
Ginseng	50647-08-0	Rats	5 days	Gavage	Ongoing	William Gwinn
Goldenseal extract	84603-60-1	Rats	5 days	Gavage	Ongoing	Scott Auerbach
Green tea extract	N/A	Rats	5 days	Gavage	Ongoing	Scott Auerbach
Gum guggul extract	N/A	Rats, mice	13 weeks	Gavage	Completed	Troy Hubbard
Hexachlorobenzene	118-74-1	Rats	5 days, 13 weeks	Gavage	Ongoing	William Gwinn
Hexachlorocyclopentadienyl-dibromocyclooctane	51936-55-1	Rats	5 days	Gavage	Ongoing	June Dunnick

Test Article	CASRN *	Species	Length	Route	Status	Study Scientist
Insertional mutagenesis – definitive vector study	N/A	Mice	14 months	Intravenous	Completed	Dori Germolec
Ionic liquid: 1-butyl-1-methylpyrrolidinium chloride	479500-35-1	Rats, mice	90 days	Dosed-water	Ongoing	Kristen Ryan
Ionic liquid: 1-butyl-3-methylimidazolium chloride	79917-90-1	Rats, mice	90 days	Dosed-water	Ongoing	Kristen Ryan
Ionic liquid: 1-ethyl-3-methylimidazolium chloride	65039-09-0	Rats, mice	90 days	Dosed-water	Ongoing	Kristen Ryan
Ionic liquid: N-butylpyridinium chloride	1124-64-7	Rats, mice	90 days	Dosed-water	Ongoing	Kristen Ryan
Isopropylated phenol phosphate	68937-41-7	Rats	13 weeks	Dosed-feed	Initiated	Mamta Behl
		Mice	2 weeks, 13 weeks	Dosed-feed	Ongoing	Mamta Behl
Libby amphibole 2007	LA2007	Rats	7 months	Inhalation	Ongoing	Matthew Stout
Melamine + cyanuric acid combination	N/A	Rats	90 days, 90 days + recovery	Gavage	Ongoing	Goncalo Gamboa da Costa
		Rats	90 days	Gavage	Ongoing	Luísa Camacho
Methyleugenol	93-15-2	Rats	5 days	Gavage	Ongoing	William Gwinn
Microbiome	N/A	N/A	N/A	N/A	Ongoing	Sangeeta Khare
Milk thistle extract	84604-20-6	Rats	5 days	Gavage	Ongoing	William Gwinn
Mixed xylenes	N/A	Rats, mice	30 days, 2 years	Inhalation	Initiated	Kristen Ryan
Nanoscale material (fullerene-C60 1 micron)	99685-96-8	Rats, mice	90 days	Inhalation	Completed	Dori Germolec
Nanoscale material (fullerene-C60 50 nanometers)	99685-96-8	Rats, mice	90 days	Inhalation	Completed	Dori Germolec
Nattokinase and lumbrokinase	N/A	Rats	28 days	Gavage	Ongoing	Luisa Camacho
N-Butylbenzenesulfonamide	3622-84-2	Mice	14 days	Dosed-feed	Ongoing	Cynthia Rider
		Rats, mice	13 weeks	Dosed-feed	Ongoing	Cynthia Rider
Pentabromodiphenyl ether mixture [DE-71 (technical grade)]	32534-81-9	Rats	5 days	Gavage	Ongoing	William Gwinn
Perfluorohexanesulfonamide	41997-13-1	Rats	5 days	Gavage	Initiated	Scott Auerbach
Perfluorooctanoic acid (PFOA)	335-67-1	Rats	2 years	Dosed-feed	Completed	Chad Blystone
		Rats	5 days	Gavage	Ongoing	William Gwinn

Test Article	CASRN *	Species	Length	Route	Status	Study Scientist
Phenolic benzotriazoles (2-(2H-benzotriazol-2-yl)-4,6-bis(1-methyl-1-phenylethyl)phenol)	70321-86-7	Rats	14 days	Gavage	Ongoing	Chad Blystone
Phenolic benzotriazoles (2-(2H-benzotriazol-2-yl)-4,6-bis(1,1-dimethylpropyl)phenol)	25973-55-1	Rats	14 days	Gavage	Ongoing	Chad Blystone
Phenolic benzotriazoles (2-(2H-benzotriazol-2-yl)-4-tert-butylphenol)	3147-76-0	Rats	14 days	Gavage	Ongoing	Chad Blystone
Phenolic benzotriazoles (2-(2H-benzotriazol-2-yl)phenol)	10096-91-0	Rats	14 days	Gavage	Ongoing	Chad Blystone
Phenolic benzotriazoles (2-(5-chloro-2H-benzotriazol-2-yl)-4,6-bis(1,1-dimethylethyl)phenol)	3864-99-1	Rats	14 days	Gavage	Ongoing	Chad Blystone
Phenolic benzotriazoles (3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxybenzenepropanoic acid, octyl ester)	84268-23-5	Rats	14 days	Gavage	Ongoing	Chad Blystone
Phenolic benzotriazoles (bumetrizole)	3896-11-5	Rats	14 days	Gavage	Ongoing	Chad Blystone
Phenolic benzotriazoles (drometrizole)	2440-22-4	Rats	14 days	Gavage	Ongoing	Chad Blystone
Phenolic benzotriazoles (octrizole)	3147-75-9	Rats	14 days	Gavage	Ongoing	Chad Blystone
Pulegone	89-82-7	Rats	5 days	Gavage	Ongoing	William Gwinn
QT drugs (bepridil hydrochloride)	74764-40-2	Dogs	1 day	Per os (capsule)	Completed	Michelle Hooth
QT drugs (diltiazem hydrochloride)	33286-22-5	Dogs	1 day	Per os (capsule)	Completed	Michelle Hooth
QT drugs (loratadine)	79794-75-5	Dogs	1 day	Per os (capsule)	Completed	Michelle Hooth
QT drugs (lovastatin)	75330-75-5	Dogs	1 day	Per os (capsule)	Completed	Michelle Hooth
QT drugs (sotalol hydrochloride)	959-24-0	Dogs	1 day	Per os (capsule)	Completed	Michelle Hooth
QT drugs (terfenadine)	50679-08-8	Dogs	1 day	Per os (capsule)	Completed	Michelle Hooth
Resveratrol	501-36-0	Rats, mice	2 weeks, 13 weeks, 2 years	Gavage	Ongoing	Mimi Huang
Sodium metavanadate	13718-26-8	Rats, mice	90 days	Dosed-water	Ongoing	Georgia Roberts
Sodium tungstate dihydrate	10213-10-2	Rats, mice	13 weeks, 2 years	Dosed-water	Ongoing	Mamta Behl
Stachybotrys chartarum	67892-26-6	Mice	13 weeks	Inhalation	Ongoing	Dori Germolec

Test Article	CASRN *	Species	Length	Route	Status	Study Scientist
Stachybotrys chartarum strain 1 mold (macrocyclic trichothecene chemotype)	N/A	Mice	90 days	Inhalation	Ongoing	Dori Germolec
Sulfolane	126-33-0	Rats, mice, guinea pigs	28 days	Gavage	Ongoing	Chad Blystone
		Rats	2 years	Dosed-water	Ongoing	Chad Blystone
		Rats, mice	2 years	Dosed-water	Ongoing	Chad Blystone
Tetrabromobisphenol A	79-94-7	Rats	5 days	Gavage	Ongoing	William Gwinn
Tetrabromobisphenol A-bis (2,3-dibromopropyl ether)	21850-44-2	Rats	N/A	Dosed-water	Ongoing	June Dunnick
Thallium (I) sulfate	7446-18-6	Mice	2 weeks, 90 days	Dosed-water	Ongoing	Kelly Shipkowski
		Rats	GD 6 to PND 28, 90 days	Dosed-water	Ongoing	Kelly Shipkowski
Triclosan	3380-34-5	Mice	90 days	Dermal	Completed	Jia-Long Fang
		Rats	5 days	Gavage	Ongoing	William Gwinn
Trimethylsilyldiazomethane (TMSD)	18107-18-1	Rats, mice	10 days	Inhalation	Ongoing	William Gwinn
Triphenyl phosphate	115-86-6	Mice	2 weeks	Dosed-feed	Ongoing	Mamta Behl
Tris(chloropropyl) phosphate (TCPP)	13674-84-5	Rats	5 days	Gavage	Ongoing	William Gwinn
		Rats, mice	90 days, 2 years	Dosed-feed	Ongoing	Kristen Ryan
Valerian (Valeriana officinalis L.) root extract	8057-49-6	Mice	90 days	Gavage	Ongoing	Nigel Walker
Vanadyl sulfate	27774-13-6	Rats, mice	90 days	Dosed-water	Ongoing	Georgia Roberts
Water disinfection byproducts (bromodichloroacetic acid)	71133-14-7	Rats	5 days	Gavage	Ongoing	William Gwinn

*CASRN = Chemical Abstracts Service Registry Number.

Toxicogenomic studies

NTP is incorporating the latest [toxicogenomic technologies](#), including next-generation (NextGen) sequencing, microarrays, and metabolomic analyses, into its testing program to gain further insights into the toxicity of environmental substances. Toxicogenomics examines how the entire genetic structure, or genome, influences an organism's response to environmental toxicants.

Toxicogenomic Studies Ongoing in FY 2020

Test Article	CASRN*	Species/Cell Line	Route	Duration	Test Type (Platform)	Study Scientist
10:2 Fluorotelomer alcohol	865-86-10	Rat liver	Gavage	5 days	S1500+ NextGen sequencing	Scott Auerbach
1-Methylfluorene	1730-37-6	Human hepatocyte cell line	In vitro	2 days	Cytotoxicity and gene expression by quantitative polymerase chain reaction	Cynthia Rider, Erik Tokar
2,2',4,4',5-Pentabromodiphenyl ether	60348-60-9	DO mouse iPSC neuro-progenitor cells	In vitro	24 hours	RNA-Seq	Alison Harrill, Dahea You
2,3-Benzofluorene	243-17-4	Rat liver	Gavage	5 days	S1500+ NextGen sequencing	Scott Auerbach
20-chemical compound test set (environmental compounds)	N/A	Primary rat hepatocytes, human HepaRG spheroids	In vitro	3 days	S1500+ NextGen sequencing	William Gwinn, Nancy Urbano
20-environmental NTP chemical compound test set	N/A	Rat plasma	Gavage	5 days	Metabolomics	David Crizer
2-Ethylhexyl diphenyl phosphate	1241-94-7	Rat liver	Gavage	5 days	Microarray (Affymetrix), metabolomics	Scott Auerbach, Mamta Behl
315-chemical compound test set (pharmaceuticals and environmental compounds)	N/A	Human hepatocyte HepaRG	In vitro	2 days	S1500+ NextGen sequencing	Stephen Ferguson, Sreenivasa Ramaiahgari
6:1 Fluorotelomer alcohol	375-82-6	Rat liver	Gavage	5 days	S1500+ NextGen sequencing	Scott Auerbach
9-Methylanthracene	779-02-2	Human hepatocyte cell line	In vitro	2 days	Cytotoxicity and gene expression by quantitative polymerase chain reaction	Cynthia Rider, Erik Tokar
Acenaphthenequinone	82-86-0	Human hepatocyte cell line	In vitro	2 days	Cytotoxicity and gene expression by quantitative polymerase chain reaction	Cynthia Rider, Erik Tokar
Aqueous Firefighting Foams	N/A	3D human HepaRG spheroids	In vitro	2 days	S1500+ NextGen sequencing	Stephen Ferguson, Sreenivasa Ramaiahgari

Test Article	CASRN *	Species/Cell Line	Route	Duration	Test Type (Platform)	Study Scientist
Aflatoxin B1	1162-65-80	Rat liver	Oral	14–150 days	Exome-Seq	Julie Foley, Alex Merrick
Benzo(a)pyrene	50-32-8	Human hepatocyte cell line	In vitro	2 days	Cytotoxicity and gene expression by quantitative polymerase chain reaction	Cynthia Rider, Erik Tokar
Benzo[b]fluoranthene	205-99-2	Human hepatocyte cell line	In vitro	2 days	Cytotoxicity and gene expression by quantitative polymerase chain reaction	Cynthia Rider, Erik Tokar
Developmental neurotoxicant library (~94 chemicals)	N/A	Human embryoid bodies, induced pluripotent stem cells	N/A	N/A	RNA-Seq	Erik Tokar
Dibenz[a,h]anthracene	53-70-3	Human hepatocyte cell line	In vitro	2 days	Cytotoxicity and gene expression by quantitative polymerase chain reaction	Cynthia Rider, Erik Tokar
Dieldrin	60-57-1	Mouse	In vitro	1 day	S1500+, NextGen sequencing	Alison Harrill
		DO mouse iPSC neuro-progenitor cells	In vitro	24 hours	RNA-Seq	Alison Harrill, Dahea You
Ethinyl estradiol	57-63-6	Mouse	In vitro	1 day	S1500+, NextGen sequencing	Alison Harrill
		DO mouse iPSC neuro-progenitor cells	In vitro	24 hours	RNA-Seq	Alison Harrill, Dahea You
Ginkgo biloba extract	90045-36-6	Rat	Gavage	5 days	Microarray (Affymetrix)	Cynthia Rider, Scott Auerbach
Hexafluoropropylene oxide (HFPO) dimer acid and its ammonium salt (referred to as GenX chemicals)	13252-13-6, 62037-80-3	Mouse liver, placenta	Gavage	E17.5 gestational exposure	Microarray	Sue Fenton
Isodecyl diphenyl phosphate	29761-21-5	Rat liver	Gavage	5 days	Microarray (Affymetrix), metabolomics	Scott Auerbach, Mamta Behl
Isopropylated phenol phosphate	68937-41-7	Rat liver	Gavage	5 days	Microarray (Affymetrix), metabolomics	Scott Auerbach, Mamta Behl
Isopropylated phosphate (3:1)	60348-60-9	Mouse	In vitro	1 day	S1500+, NextGen sequencing	Alison Harrill
Methyl mercuric II chloride	115-09-3	DO mouse iPSC neuro-progenitor cells	In vitro	24 hours	RNA-Seq	Alison Harrill, Dahea You
Methyl mercury	115-09-3	Mouse	In vitro	1 day	S1500+, NextGen sequencing	Alison Harrill

Test Article	CASRN*	Species/Cell Line	Route	Duration	Test Type (Platform)	Study Scientist
High-fat diet	N/A	DO mouse	Feed	13 weeks	RNA-Seq	Alison Harrill, Dahea You, Mimi Huang
Time course	N/A	HepaRG	In vitro	1–21 days	S1500+ NextGen sequencing	Katelyn Lavrich, Steve Ferguson
N-ethyl-N-nitrosourea	759-73-9	Harlan Sprague Dawley rat	Tail vein, intravenous	Single injection; brain tumor model	RNA-Seq; miRNA-Seq; Exome-Seq	Arun Pandiri, Ramesh Kovi
PCB-11	2050-67-1	Rat hepatocytes, human hepatocyte HepaRG cells	In vitro	1 day	S1500+ NextGen sequencing	Steve Ferguson
Pentabromodiphenyl ether	60348-60-9	Mouse	In vitro	1 day	S1500+, NextGen sequencing	Alison Harrill
Perfluorohexanesulfonamide	41997-13-1	Rat liver	Gavage	5 days	S1500+ NextGen sequencing	Scott Auerbach
Perinaphthenone	548-39-0	Human hepatocyte cell line	In vitro	2 days	Cytotoxicity and gene expression by quantitative polymerase chain reaction	Cynthia Rider, Erik Tokar
PFAS library (120 compounds)	N/A	Human HepaRG spheroids	In vitro	3 days	S1500+ NextGen sequencing	Stephen Ferguson, Sreenivasa Ramaiahgari
PFOA	335-67-1	Mouse liver, placenta	Gavage	E17.5 gestational exposure	Microarray	Sue Fenton
Phenanthrene	85-01-8	Human hepatocyte cell line	In vitro	2 days	Cytotoxicity and gene expression by quantitative polymerase chain reaction	Cynthia Rider, Erik Tokar
Phenol	68937-41-7	Mouse	In vitro	1 day	S1500+, NextGen sequencing	Alison Harrill
Phenol, isopropylated, phosphate (3:1)	68937-41-7	DO mouse iPSC neuro-progenitor cells	In vitro	24 hours	RNA-Seq	Alison Harrill, Dahea You
Pyrene	129-00-0	Human hepatocyte cell line	In vitro	2 days	Cytotoxicity and gene expression by quantitative polymerase chain reaction	Cynthia Rider, Erik Tokar
Rotenone	83-79-4	Mouse	In vitro	1 day	S1500+, NextGen sequencing	Alison Harrill
		DO mouse iPSC neuro-progenitor cells	In vitro	24 hours	RNA-Seq	Alison Harrill, Dahea You
Tert-Butylphenyl diphenyl phosphate	56803-37-3	Rat liver	Gavage	5 days	Microarray (Affymetrix), metabolomics	Scott Auerbach, Mamta Behl

*CASRN = Chemical Abstracts Service Registry Number.