Name	CAS No.	In AOPWiki	Link to EPA Comptox	AOPWiki		MIE		KE	AO	AOP Graphic	Lim Ja Un_Case analysis in semiconductor workers	sAOP link	19 research	
(2-(2,3-epoxypropoxy)propyl)diethoxymethylsilane	2897-60-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2044638#exec_sum									sAOP#2897-60-1.jpg	Carcinogenicity	
1,1,1-Trichloroethane	71-55-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0021381#exec_sum									-		
1,2-Dichloroethylene, all isomers	156-59-2 156-60-5 540-59-0	**AOP Links: 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7024031#exec_sum https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2024030#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/187	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration	**1136 Impaired recruitment , Population trajectory**			sAOP#156-59-2.jpg		
1,4-dioxane	123-91-1	No AOPs available									-	sAOP#123-91-1.jpg		
1-Methoxy-2-propanol	107-98-2	**AOP Links: 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8024284#exec_sum	Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/200	1181 Activation, Estrogen receptor	https://aopwiki.org/events/1181	1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts 1198 Activation, Macrophages 1213 Increased, Angiogenesis 1239 Altered, Gene Expression 1240 Altered, Protein Production 1241 Increased, Motility 1242 Increased, Second Messenger Production	**1193 N/A, Breast Cancer**			sAOP#107-98-2.jpg		
1-Methoxy-2-propyl acetate	108-65-6	**AOP Links: 150, 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1026796#exec_sum	Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/150 https://aopwiki.org/aops/187	18 Activation, AhR 1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin	https://aopwiki.org/events/18 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	944 dimerization, AHR/ARNT 1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration 945 reduced dimerization, ARNT/HIF1-alpha 948 reduced production, VEGF 110 Impairment, Endothelial network 317 Altered, Cardiovascular development/function	**947 Increase, Early Life Stage Mortality** **1136 Impaired recruitment , Population trajectory**			sAOP#108-65-6.jpg		
1-nitronaphthalene	86-57-7	**AOP Links: 60, 107, 150, 163, 177, 195, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7020578#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF PPARgamma activation leading to sarcomas in rats, mice, and hamsters Cyclooxygenase 1 (COX1) inhibition leading to renal failure and mortality 5-hydroxytryptamine transporter (5-HTT) inhibition leading to population increase Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/60 https://aopwiki.org/aops/107 https://aopwiki.org/aops/150 https://aopwiki.org/aops/163 https://aopwiki.org/aops/177 https://aopwiki.org/aops/195 https://aopwiki.org/aops/200	245 Activation, PXR/SXR 715 Activation, Constitutive androstane receptor 18 Activation, AhR 1028 Activation of specific nuclear receptors, PPAR-gamma activation 1103 Inhibition, Cyclooxygenase 1 activity 619 Inhibition, 5-hydroxytryptamine transporter (5-HTT; SERT) 1181 Activation, Estrogen receptor	https://aopwiki.org/events/245 https://aopwiki.org/events/715 https://aopwiki.org/events/18 https://aopwiki.org/events/1028 https://aopwiki.org/events/1103 https://aopwiki.org/events/619 https://aopwiki.org/events/1181	471 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36 465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid 1214 Altered gene expression specific to CAR activation, Hepatocytes 716 Increase, Mitogenic cell proliferation (hepatocytes) 774 Increase, Preneoplastic foci (hepatocytes) 944 dimerization, AHR/ARNT 945 reduced dimerization, ARNT/HIF1-alpha 948 reduced production, VEGF 110 Impairment, Endothelial network 317 Altered, Cardiovascular development/function 1029 Increased, adipogenesis Increased, adipogenesis 1032 Increased, secretion of local growth factors 1033 Increased, proliferation of mesenchymal cells 1034 Increased, IGF-1 (mouse)	**469 Increased, Liver Steatosis** **719 Increase, Adenomas/carcinomas (hepatocellular)** **947 Increase, Early Life Stage Mortality** **351 Increased Mortality** **361 Decline, Population** **1164 Increased, Population** **1193 N/A, Breast Cancer**			sAOP#86-57-7.jpg	Mutagenicity	
2-Nitropropane	108-03-2	**AOP Links: 150, 177**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1020980#exec_sum	Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF Cyclooxygenase 1 (COX1) inhibition leading to renal failure and mortality	https://aopwiki.org/aops/150 https://aopwiki.org/aops/177	18 Activation, AhR 1103 Inhibition, Cyclooxygenase 1 activity	https://aopwiki.org/events/18 https://aopwiki.org/events/1103	944 dimerization, AHR/ARNT 945 reduced dimerization, ARNT/HIF1-alpha 948 reduced production, VEGF 110 Impairment, Endothelial network 317 Altered, Cardiovascular development/function 1104 Decreased, Prostaglandin F2alpha concentration, plasma 1105 Occurrence, renal ischemia 1097 Occurrence, renal proximal tubular necrosis 1098 Increased, blood potassium concentration 1106 Occurrence, cardiac arrhythmia 1088 Increased, Oxidative Stress 1096 Increased, blood uric acid concentration 1102 Occurrence, tophi (urate) deposition	**947 Increase, Early Life Stage Mortality** **351 Increased Mortality** **361 Decline, Population**			sAOP#108-03-2.jpg		

2-(2-Aminoethoxy)-ethanol	929-06-6	**AOP Links: 107**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6027341#exec_sum	Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat	https://aopwiki.org/aops/107	715 Activation, Constitutive androstane receptor	https://aopwiki.org/events/715	1214 Altered gene expression specific to CAR activation, Hepatocytes 716 Increase, Mitogenic cell proliferation (hepatocytes) 774 Increase, Preneoplastic foci (hepatocytes)	**719 Increase, Adenomas/carcinomas (hepatocellular)**	https://aopwiki.org/system/dragonfly/production/2018/05/31/1n1zo2kaml.Graphic_CAR_AOP_revised.Map2018pptx.png		aAOP#929-06-6.jpg		
2-(2-Ethoxyethoxy) ethanol	111-90-0	**AOP Links: 58**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2021941#exec_sum	NR1I3 (CAR) suppression leading to hepatic steatosis	https://aopwiki.org/aops/58	456 Suppression, Constitutive androstane receptor, NR1I3 468 Inhibition, PPAR alpha 167 Activation, LXR 228 peroxisome proliferator activated receptor promoter demethylation	https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228	457 Activation, SREBF1 66 Activation, ChREBP 458 Increased, De Novo FA synthesis 454 Increased, Triglyceride formation 54 Up Regulation, CD36 462 Up Regulation, SCD-1 463 Up Regulation, FAS 451 Inhibition, Mitochondrial fatty acid beta-oxidation 327 Accumulation, Fatty acid 470 Up Regulation, Acetyl-CoA carboxylase-1 (ACC-1) 465 Increased, FA Influx	**459 Increased, Liver Steatosis**			aAOP#111-90-0.jpg		
2-(2-Ethoxyethoxy) ethyl acetate	112-15-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6026905#exec_sum									-		
2-(p-methoxystyryl)-4,6-bistrichloromethyl)-1,3,5-triazine	42573-57-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4068406#exec_sum									-	Carcinogenicity	
2,2'-((3,3',5,5'-tetramethyl-(1,1'-biphenyl)-4,4'-diyl)-bis(oxymethylene))-bis-oxirane	86954-11-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6088669#exec_sum									-	Carcinogenicity	
2,2'-6,6'-Tetrabromobisphenol A	79-94-7	**AOP Links: 36, 58, 59, 60, 61, 66, 107, 124, 153, 163, 175, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1026081#exec_sum	Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis NR1I3 (CAR) suppression leading to hepatic steatosis HNF4alpha suppression leading to hepatic steatosis NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis NFE2L2/FXR activation leading to hepatic steatosis Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat HMG-CoA reductase inhibition leading to decreased fertility Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats PPARgamma activation leading to sarcomas in rats, mice, and hamsters Thyroperoxidase inhibition leading to altered amphibian metamorphosis	https://aopwiki.org/aops/36 https://aopwiki.org/aops/58 https://aopwiki.org/aops/59 https://aopwiki.org/aops/60 https://aopwiki.org/aops/61 https://aopwiki.org/aops/66 https://aopwiki.org/aops/107 https://aopwiki.org/aops/124 https://aopwiki.org/aops/153 https://aopwiki.org/aops/163 https://aopwiki.org/aops/175 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	231 Decreased, PPAR-alpha activation 232 Decreased, PPAR-beta activation 233 Decreased, PPAR-gamma activation 456 Suppression, Constitutive androstane receptor, NR1I3 468 Inhibition, PPAR alpha 167 Activation, LXR 228 peroxisome proliferator activated receptor promoter demethylation 461 Suppression, HNF4alpha 245 Activation, PXR/SXR 478 Activation,NRF2 479 Activation,NR1H4 653 DecreasedtestosteronebythefetalLeydigcells,IncreasedcorticosteroneDecreasedtestosteronebythefetalLeydigcells,Activationbyotherglucocorticoidreceptoragonists. 654 715 Activation, Constitutive androstane receptor 804 Inhibition, HMG-CoA reductase 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol 1028 Activation of specific nuclear receptors, PPAR-gamma activation	https://aopwiki.org/events/231 https://aopwiki.org/events/232 https://aopwiki.org/events/233 https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/461 https://aopwiki.org/events/245 https://aopwiki.org/events/478 https://aopwiki.org/events/479 https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/715 https://aopwiki.org/events/804 https://aopwiki.org/events/964	327 Accumulation, Fatty acid Accumulation, Fatty acid 140 Decreased, HSD17B10 expression Decreased, HSD17B10 expression 179 Decreased, Mitochondrial fatty acid beta-oxidation Decreased, Mitochondrial fatty acid beta-oxidation 8 Decreased, 3-hydroxyacyl-CoA dehydrogenase type-2 activity 457 Activation, SREBF1 66 Activation, ChREBP 458 Increased, De Novo FA synthesis 454 Increased, Triglyceride formation 54 Up Regulation, CD36 462 Up Regulation, SCD-1 463 Up Regulation, FAS 451 Inhibition, Mitochondrial fatty acid beta-oxidation 327 Accumulation, Fatty acid 470 Up Regulation, Acetyl-CoA carboxylase-1 (ACC-1) 465 Increased, FA Influx 471Inhibition,FoxA2Inhibition,FoxA2 179Decreased,Mitochondrialfattyacidbeta-oxidation 472DownRegulation,CPT1A 474DownRegulation,HMGCS2 462UpRegulation,SCD-1 54UpRegulation,CD36 465IncreasedFAInflux	**459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **505 Decreased sperm quantity / quality in the adult, Decreased fertility** **719 Increase, Adenomas/carcinomas (hepatocellular)** **330 Decrease, Fertility** **972 Decreased fertility, Reduced number of oocytes ovulated** **1101 Altered, Amphibian metamorphosis** **1136 Impaired recruitment , Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2018/05/31/1n1zo2kaml.Graphic_CAR_AOP_revised.Map2018pptx.png https://aopwiki.org/system/dragonfly/production/2016/12/02/3y5epyaeue.Amphib_TPO_AOP.jpg https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg	-		
2,2'-(methylenebis(phenylene)oxymethylene))bisoxirane	39817-09-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5088320#exec_sum									-	Mutagenicity	
2,3-dibromopropan-1-ol	96-13-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7021817#exec_sum									-	Mutagenicity	

2,4,6,8-Tetramethylcyclotetrasiloxane	2370-88-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID10870958#exec_sum									-			
6-(2,5-di-tert-butyl-4-bisiran-2-ylmethoxy)phenoxymethylbisirane	64777-22-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID40288784#exec_sum									-		Mutagenicity	
2-Butanone	78-93-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3021516#exec_sum									-			
2-Butoxyethanol	111-76-2	**AOP Links: 58, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1024097#exec_sum	NR1I3 (CAR) suppression leading to hepatic steatosis Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/58 https://aopwiki.org/aops/200	456 Suppression, Constitutive androstane receptor, NR1I3 468 Inhibition, PPAR alpha 167 Activation, LXR 228 peroxisome proliferator activated receptor promoter demethylation 1181 Activation, Estrogen receptor	https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/1181	457 Activation, SREBF1 66 Activation, ChREBP 458 Increased, De Novo FA synthesis 454 Increased, Triglyceride formation 54 Up Regulation, CD36 462 Up Regulation, SCD-1 463 Up Regulation, FAS 451 Inhibition, Mitochondrial fatty acid beta-oxidation 327 Accumulation, Fatty acid 470 Up Regulation, Acetyl-CoA carboxylase-1 (ACC-1) 465 Increased, FA Influx 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion	**459 Increased, Liver Steatosis** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		aAOP#111-76-2.jpg		
2-Ethoxyethanol	110-80-5	**AOP Links: 58**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7024087#exec_sum	NR1I3 (CAR) suppression leading to hepatic steatosis	https://aopwiki.org/aops/58	456 Suppression, Constitutive androstane receptor, NR1I3 468 Inhibition, PPAR alpha 167 Activation, LXR 228 peroxisome proliferator activated receptor promoter demethylation	https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228	457 Activation, SREBF1 66 Activation, ChREBP 458 Increased, De Novo FA synthesis 454 Increased, Triglyceride formation 54 Up Regulation, CD36 462 Up Regulation, SCD-1 463 Up Regulation, FAS 451 Inhibition, Mitochondrial fatty acid beta-oxidation 327 Accumulation, Fatty acid 470 Up Regulation, Acetyl-CoA carboxylase-1 (ACC-1) 465 Increased, FA Influx	**459 Increased, Liver Steatosis**			aAOP#110-80-5.jpg		
2-Ethoxyethyl acetate	111-15-9	**AOP Links: 60**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9021928#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis	https://aopwiki.org/aops/60	245 Activation, PXR/SXR	https://aopwiki.org/events/245	471 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36 465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid	**459 Increased, Liver Steatosis**			aAOP#111-15-9.jpg		

2-Heptanone	110-43-0	**AOP Links: 36, 61, 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5021916#exec_sum	Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis NFE2L2/FXR activation leading to hepatic steatosis Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/36 https://aopwiki.org/aops/61 https://aopwiki.org/aops/187	231 Decreased, PPAR-alpha activation 232 Decreased, PPAR-beta activation 233 Decreased, PPAR-gamma activation 478 Activation, NRF2 479 Activation, NR1H4 1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin	https://aopwiki.org/events/231 https://aopwiki.org/events/232 https://aopwiki.org/events/233 https://aopwiki.org/events/478 https://aopwiki.org/events/479 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	327 Accumulation, Fatty acid Accumulation, Fatty acid 140 Decreased, HSD17B10 expression Decreased, HSD17B10 expression 179 Decreased, Mitochondrial fatty acid beta-oxidation Decreased, Mitochondrial fatty acid beta-oxidation 8 Decreased, 3-hydroxyacyl-CoA dehydrogenase type-2 activity 480 Activation, SHP 227 Activation, PPARα 482 Decreased, DHB4/HSD17B4 451 Inhibition, Mitochondrial fatty acid beta-oxidation 483 Activation, LXR alpha 878 Inhibition, SREBP1c 879 Activation, MTTP 880 Increased, Apo$B100 881 Increased, Triglyceride 458 Increased, De Novo FA synthesis 1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors	**459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **1136 Impaired recruitment , Population trajectory**			sAOPW110-43-0.jpg		
2-Methoxy-1-propanol	1589-47-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5049441#exec_sum									-		
2-Methoxy-1-propyl acetate	70657-70-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5041433#exec_sum									-		
2-Methoxyethanol	109-86-4	**AOP Links: 60, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5024182#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/60 https://aopwiki.org/aops/200	245 Activation, PXR/SXR 1181 Activation, Estrogen receptor	https://aopwiki.org/events/245 https://aopwiki.org/events/1181	471 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36 465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts	**459 Increased, Liver Steatosis** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg	84년생, 여성 (다발성경화증)	sAOPW109-86-4.jpg	- 삼성전자(기흥),반도체 - CMP, 세정, Metal, 포토, CVD, 식각, 검사/오퍼레이터	- 아세톤, 신너, 벤젠, 톨루엔, 크실렌, 페놀, 크레졸, 2-매톡시에탄올, 황산 등
2-Methylimidazole	693-98-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4022107#exec_sum										sAOPW693-98-1.jpg		
4,4'-bis(chloromethyl)-1,1'-biphenyl	1667-10-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2016815#exec_sum									-		Carcinogenicity	
4-Chloro-2-methylphenol	1570-64-5	**AOP Links: 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5022510#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin 1181 Activation, Estrogen receptor	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts	**1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOPW1570-64-5.jpg		

9-Bromoanthracene	1564-64-3	**AOP Links: 36, 107, 163, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6049224#exec_sum	Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat PPARgamma activation leading to sarcomas in rats, mice, and hamsters Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/36 https://aopwiki.org/aops/107 https://aopwiki.org/aops/163 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	231Decreased,PPAR-alphaactivation 232Decreased,PPAR-betaactivation 233Decreased,PPAR-gammaactivation 715 Activation, Constitutive androstane receptor 1028 Activation of specific nuclear receptors, PPAR-gamma activation 1134IrreversibleinhibitionofhepaticVKORbybindingofARattyrosine139,FailuretocyclevitaminKepoxidetovitaminKtoformvitaminKhydroquinone 1138Uncouplingofoxidativephosphorylation,ReducedabilitytogenerateATP 1169AnticoagulantrodenticideinterfereswithcarboxylationofGlaproteinsinbone,Impairmentofpost-translationalmodification(carboxylation)ofosteocalcin 1181 Activation, Estrogen receptor	https://aopwiki.org/events/231 https://aopwiki.org/events/232 https://aopwiki.org/events/233 https://aopwiki.org/events/715 https://aopwiki.org/events/1028 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	327Accumulation,FattyacidAccumulation,Fattyacid 140Decreased,HSD17B10expressionDecreased,HSD17B10expression 179Decreased,Mitochondrialfattyacidbeta-oxidationDecreased,Mitochondrialfattyacidbeta-oxidation 8Decreased,3-hydroxyacyl-CoAdehydrogenasetype-2activity 1214AlteredgeneexpressionspecifictoCARactivation,Hepatocytes 716Increase,Mitogeniccellproliferation(hepatocytes) 774Increase,Preneoplasticfoci(hepatocytes) 1029Increased,adipogenesisIncreased,adipogenesis 1032Increased,secretionoflocalgrowthfactors 1033Increased,proliferationofmesenchymalcells 1034Increased,IGF-1(mouse) 1035Increased,Firbrosarcoma 1036Increased,liposarcoma 1037Increased,hemagiosarcoma 1122Undercarboxylatedclottingfactorswillnotassembleoncellsurfacestoformclot,Failureofsecondaryhemostasis 1130Failureinvascularrepairmechanisms,Unresolvedbloodloss(hemorrhage) 1131Failureingamma-glutamylcarboxylationofclottingfactorsII,VII,IXandX,Undercarboxylationofclottingfactors(e.g.,des-gamma-carboxyprothrombin) 1132Bloodlossanddevelopmentofanemia,Impairedoxygendeliveryandnutrientdeliverytotissue,impairedcarbondioxideandwasteproductremoval 1133Hemostasis,Depletionfrombloodoffullyfunctionalcarboxylatedclottingfactors 1135Reducedfitnessorevenmortality,Acidosis,hypovolemicshockandorgandysfunction	**459 Increased, Liver Steatosis** **719 Increase, Adenomas/carcinomas (hepatocellular)** **1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP₩1564-64-3.jpg	Mutagenicity	
Acetaldehyde	75-07-0	**AOP Links: 36, 61, 66, 107, 153, 163, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5039224#exec_sum	Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis NFE2L2/FXR activation leading to hepatic steatosis Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats PPARgamma activation leading to sarcomas in rats, mice, and hamsters Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/36 https://aopwiki.org/aops/61 https://aopwiki.org/aops/66 https://aopwiki.org/aops/107 https://aopwiki.org/aops/153 https://aopwiki.org/aops/163 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	231Decreased,PPAR-alphaactivation 232Decreased,PPAR-betaactivation 233Decreased,PPAR-gammaactivation 478Activation,NRF2 479Activation,NR1H4 653DecreasedtestosteronebythefetalLeydigcells,Increasedcorticosterone 654DecreasedtestosteronebythefetalLeydigcells,Activationbyotherglucocorticoidreceptoragonists 715 Activation, Constitutive androstane receptor 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol 1028 Activation of specific nuclear receptors, PPAR-gamma activation 1134IrreversibleinhibitionofhepaticVKORbybindingofARattyrosine139,FailuretocyclevitaminKepoxidetovitaminKtoformvitaminKhydroquinone 1138Uncouplingofoxidativephosphorylation,ReducedabilitytogenerateATP 1169AnticoagulantrodenticideinterfereswithcarboxylationofGlaproteinsinbone,Impairmentofpost-translationalmodification(carboxylation)ofosteocalcin 1181 Activation, Estrogen receptor	https://aopwiki.org/events/231 https://aopwiki.org/events/232 https://aopwiki.org/events/233 https://aopwiki.org/events/478 https://aopwiki.org/events/479 https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/715 https://aopwiki.org/events/964 https://aopwiki.org/events/1028 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	327Accumulation,FattyacidAccumulation,Fattyacid 140Decreased,HSD17B10expressionDecreased,HSD17B10expression 179Decreased,Mitochondrialfattyacidbeta-oxidationDecreased,Mitochondrialfattyacidbeta-oxidation 8Decreased,3-hydroxyacyl-CoAdehydrogenasetype-2activity 480Activation,SHP 227Activation,PPARα 482Decreased,DHB4/HSD17B4 451Inhibition,Mitochondrialfattyacidbeta-oxidation 483Activation,LXRalpha 878Inhibition,SREBP1c 879Activation,MTTP 880Increased,ApoB100 881Increased,Triglyceride 458Increased,DeNovoFAsynthesis 655DecreasedtestosteronebythefetalLeydigcells,IncreasedCOUP-TFIIinfetalLeydigcells 656DecreasednumberandfunctionofadultLeydigcells,DecreasedCOUP-TFIIstemLeydigcells 657DecreasedtestosteronebythefetalLeydigcells,DysgenesisoffetalLeydigcells 1214AlteredgeneexpressionspecifictoCARactivation,Hepatocytes 716Increase,Mitogeniccellproliferation(hepatocytes) 774Increase,Preneoplasticfoci(hepatocytes) 965reductioninovariangranulosacellssynthesisofestradiol,Reducedsteroidogenicproductionofestradiolingranulosacells 966ReducedEstradiolinCirculation,Reducedsteroidogenicproductionofestradiolingranulosacellsleadingtodecreasedestradiolincirculation	**459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **505 Decreased sperm quantity / quality in the adult, Decreased fertility** **719 Increase, Adenomas/carcinomas (hepatocellular)** **972 Decreased fertility, Reduced number of oocytes ovulated** **1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2018/05/31/1n1zo2kaml_Graphic_CAR_AOP_revised_May2018pptx.jpg https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP₩75-07-0.jpg		
Acetic acid	64-19-7	**AOP Links: 36, 160, 213**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5024394#exec_sum	Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis	https://aopwiki.org/aops/36	231 Decreased, PPAR-alpha activation 232 Decreased, PPAR-beta activation 233 Decreased, PPAR-gamma activation	https://aopwiki.org/events/231 https://aopwiki.org/events/232 https://aopwiki.org/events/233	327 Accumulation, Fatty acid Accumulation, Fatty acid 140 Decreased, HSD17B10 expression Decreased, HSD17B10 expression 179 Decreased, Mitochondrial fatty acid beta-oxidation Decreased, Mitochondrial fatty acid beta-oxidation 8 Decreased, 3-hydroxyacyl-CoA dehydrogenase type-2 activity 860 859 451 460 1096 1285 1305 1312 1313 1424 1490 1528 1641	**459 Increased, Liver Steatosis**		78년생, 남성 재생불량성빈혈, 사망)	sAOP₩64-19-7.jpg	- 삼성전자(화성)_반도체 - 클린/엔지니어	- 불산, 황산, 질산, 과산화수소, 인산, 아세트산, IPA, 카테콜 등
Acetone	67-64-1	**AOP Links: 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8021482#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/187	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under	**1136 Impaired recruitment, Population trajectory**		80년생, 여성 (다발성경화증)	sAOP₩67-64-1.jpg	- 삼성전자(기흥)_LCD - OLB, TAB Solder/오퍼레이터	- IPA, 아세톤, ACF, 납, 플럭스 등
Acetonitrile	75-05-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7020009#exec_sum									-		
Acetylene	74-86-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6026379#exec_sum									-		
ACRYLIC RESINS (MONOMERS)	9003-01-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID50873988#exec_sum									-		

alpha-methyl styrene	98-83-9	AOP Links: 187		187	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	MIE 1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone MIE 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP MIE 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin		KE 1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis KE 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) KE 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) KE 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal KE 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors KE 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction KE 1151 Osteoporosis and vascular calcification, Bone deterioration	AO 1136 Impaired recruitment , Population trajectory		-	-		
Aluminum	7429-90-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3040273#exec_sum											
Aluminum nitride	24304-00-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8066977#exec_sum										-	
Aluminum phosphide	20859-73-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5023867#exec_sum										-	
Aluminum tris(8-hydroxyquinolinet)	2085-33-8	No AOPs available	-										-	
Ammonia	7664-41-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0023872#exec_sum							66 Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis 187 Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage 200 Estrogen receptor activation leading to breast cancer 294 Increased reactive oxygen and nitrogen species (RONS) leading to increased risk of breast cancer Key Event: 1351 Activated, NMDA receptor https://www.sciencedirect.com/science/article/abs/pii/S0197018602000293	59년생, 남성 (백혈병, 사망)	-	- 삼성전자(화성,기흥), 반도체 - 설비PM 관리, 연사, 노무/협력업체 관리소장 - 2003.1/2012.8	- 2013.7/2014.10 - 2015.8/2017.11
Ammonium fluoride	12125-01-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6050463#exec_sum										-	
Ammonium persulfate	7727-54-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9029691#exec_sum									aAOP#7727-54-0.jpg		

Anatase	1317-70-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9050432#exec_sum									-		
Antimony	7440-36-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5023879#exec_sum									-		
Antimony trichloride	10025-91-9	**AOP Links: 36, 58, 61, 66, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4044161#exec_sum	Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis NR1I3 (CAR) suppression leading to hepatic steatosis NF2L2/FXR activation leading to hepatic steatosis Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/36 https://aopwiki.org/aops/58 https://aopwiki.org/aops/61 https://aopwiki.org/aops/66 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	231Decreased,PPAR-alphaactivation 232Decreased,PPAR-betaactivation 233Decreased,PPAR-gammaactivation 456Suppression,Constitutiveandrostanereceptor,NR1I3 468Inhibition,PPARalpha 167Activation,LXR 228peroxisomeproliferatoractivatedreceptorpromoterdemethylation 478Activation,NRF2 479Activation,NR1H4 653Decreasedtestosteronebythefetal Leydigcells,Increasedcorticosterone 654Decreasedtestosteronebythefetal Leydigcells,Activationbyothergluccocorticoidreceptoragonists 1134Irreversibleinhibitionofhepatic VKORbybindingofARattyrosine139,Failuretocyclevitaminkepoxidetovitaminktoformvitaminkhydroquinone 1138UncouplingofoxidativephosphorylationReducedabilitytogenerateATP 1169AnticoagulantrodenticideinterfereswithcarboxylationofGlaproteinsinbone,Impairmentofpost-translationalmodification(carboxylation)ofosteocalcin 1181 Activation, Estrogen receptor	https://aopwiki.org/events/231 https://aopwiki.org/events/232 https://aopwiki.org/events/233 https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/478 https://aopwiki.org/events/479 https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	327Accumulation,FattyacidAccumulation,Fattyacid 140Decreased,HSD17B10expressionDecreased,HSD17B10expression 179Decreased,Mitochondrialfattyacidbeta-oxidationDecreased,Mitochondrialfattyacidbeta-oxidation 8Decreased,3-hydroxyacyl-CoAdehydrogenasetype-2activity 457Activation,SREBF1 66Activation,ChREBP 458Increased,DeNovoFAsynthesis 454Increased,Triglyceridedeformation 54UpRegulation,CD36 462UpRegulation,SCD-1 463UpRegulation,FAS 451Inhibition,Mitochondrialfattyacidbeta-oxidation 327Accumulation,Fattyacid 470UpRegulation,Acetyl-CoAcarboxylase-1(ACC-1) 465Increased,FAInflux 480Activation,SHP 227Activation,PPARα 482Decreased,DHB4/HSD17B4 451Inhibition,Mitochondrialfattyacidbeta-oxidation 483Activation,LXRalpha 878Inhibition,SREBP1c 879Activation,MTTP 880Increased,ApoB100 881Increased,Triglyceride	**459 Increased, Liver Steatosis** **505 Decreased sperm quantity / quality in the adult, Decreased fertility** **1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#10025-91-9.jpg		
Antimony trioxide	1309-64-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4023880#exec_sum									-		
Argon	7440-37-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3052482#exec_sum									-		
Arsenic	7440-38-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4023856#exec_sum								78년생, 남성 (재생불량성빈혈, 사망)	-	- 삼성전자(화성), 반도체 - 클린룸/엔지니어 - 2003.11/2009.3	- 2011.11/2013.11
Arsenic pentafluoride	7784-36-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4064842#exec_sum									-		
Arsenic trioxide	1327-53-3	**AOP Links: 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0020103#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors	**1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#1327-53-3.jpg		

Arsenic trisulfide	1303-33-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID50274153#exec_sum									-			
Azoxine	7784-42-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3023760#exec_sum								85년생, 여성 (백혈병, 사망)	-	- 삼성전자(기흥) 반도체 - 확산.식각/오퍼레이터 - 2003.1/2005.6	- 2007.6/2009.11 - 2010.1/2014.8
Benzene	71-43-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3039242#exec_sum							60 NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis 66 Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis 107 Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat 150 Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF	85년생, 여성 (백혈병, 사망)	-	- 삼성전자(기흥) 반도체 - 확산.식각/오퍼레이터 - 2003.1/2005.6	- 2007.6/2009.11 - 2010.1/2014.8
Bis(dimethylamino)dimethylsilane	3768-58-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8063177#exec_sum									-			
Bismuth	7440-69-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3052484#exec_sum									-			
Bismuth telluride, undoped and Se-doped	1304-82-1 37243-14-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9089483#exec_sum									-			
Bisphenol A	80-05-7	**AOP Links: 13, 33, 36, 58, 60, 61, 66, 107, 124, 150, 163, 175, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7020182#exec_sum	Chronic binding of antagonist to N-methyl-D-aspartate receptors (NMDARs) during brain development induces impairment of learning and memory abilities Kidney toxicity induced by activation of 5HT2C Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis NR1I3 (CAR) suppression leading to hepatic steatosis NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis NFE2L2/FXR activation leading to hepatic steatosis Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat HMG-CoA reductase inhibition leading to decreased fertility Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF PPARgamma activation leading to sarcomas in rats, mice, and hamsters Thyroperoxidase inhibition leading to altered amphibian metamorphosis	https://aopwiki.org/aops/13 https://aopwiki.org/aops/33 https://aopwiki.org/aops/36 https://aopwiki.org/aops/58 https://aopwiki.org/aops/60 https://aopwiki.org/aops/61 https://aopwiki.org/aops/66 https://aopwiki.org/aops/107 https://aopwiki.org/aops/124 https://aopwiki.org/aops/150 https://aopwiki.org/aops/163 https://aopwiki.org/aops/175 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	201 Binding of antagonist, NMDA receptors 9 Activation, 5HT2c 231Decreased,PPAR-alphaactivation 232Decreased,PPAR-betaactivation 233Decreased,PPAR-gammaactivation 456Suppression,Constitutiveandrostanereceptor,NR1I3 468Inhibition,PPARalpha 167Activation,LXR 228peroxisomeproliferatoractivatedreceptorpromoterdemethylation 245 Activation, PXR/SXR 478Activation,NRF2 479Activation,NR1H4 653DecreasedtestosteronebythefetalLeydigcells,Increasedcorticosterone 654DecreasedtestosteronebythefetalLeydigcells,Activationbyothergluccorticoidreceptoragonists 715 Activation, Constitutive androstane receptor	https://aopwiki.org/events/201 https://aopwiki.org/events/9 https://aopwiki.org/events/231 https://aopwiki.org/events/232 https://aopwiki.org/events/233 https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/245 https://aopwiki.org/events/478 https://aopwiki.org/events/479	52Decreased,CalciumInflux 195Inhibition,NMDARs 381ReducedlevelsofBDNF 382Aberrant,Dendriticmorphology 385Decreaseofsynaptogenesis 386Decreasefneuronalnetworkfunction 383Reduced,Presynaptickrelease of glutamate 55N/A,Cellinjury/death 294 N/A, Unknown 327Accumulation,FattyacidAccumulation,Fattyacid 140Decreased,HSD17B10expressionDecreased,HSD17B10expression 179Decreased,Mitochondrialfattyacidbeta-oxidationDecreased,Mitochondrialfattyacidbeta-oxidation 8Decreased,3-hydroxyacyl-CoAdehydrogenasetype-2activity 457Activation,SREBF1 66Activation,ChREBP 458Increased,DeNovoFAsynthesis	**341 Impairment, Learning and memory** **759 Increased, Kidney Failure** **459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **505 Decreased sperm quantity / quality in the adult, Decreased fertility** **719 Increase, Adenomas/carcinomas (hepatocellular)** **330 Decrease, Fertility** **947 Increase, Early Life Stage Mortality** **1101 Altered, Amphibian metamorphosis** **1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**			sAOPW80-05-7.jpg		
Boron	7440-42-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3023927#exec_sum									-			
Boron nitride	10043-11-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5051498#exec_sum									-			

Boron oxide	1303-86-2 12045-60-2 64566-71-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7034387#exec_sum https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID00923402#exec_sum											-
Boron tribromide	10294-33-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4065028#exec_sum											-
Boron trichloride	10294-34-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2041676#exec_sum											-
Boron trifluoride	7637-07-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7041677#exec_sum											-
Cadmium	7440-43-9	https://aopwiki.org/stressors?utf8=%E2%9C%93&search=Cadmium&commit=Search&find_by_id=	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1023940#exec_sum	AOP 257 Receptor mediated endocytosis and lysosomal overload leading to kidney toxicity		MIE 1486 Binding of substrate, endocytic receptor		KE 831 Disturbance, Lysosomal function KE 898 Disruption, Lysosome KE 709 Increase, Cytotoxicity (renal tubular cell)	**AO 814 Occurrence, Kidney toxicity**					-
Cadmium oxide	1306-19-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0024715#exec_sum					https://aopwiki.org/events/193 https://aopwiki.org/events/142 https://aopwiki.org/events/933						-
Cadmium selenide	1306-24-7 12400-33-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1061651#exec_sum											-
Cadmium sulfide	1306-23-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID30893280#exec_sum											-

Cadmium telluride	1306-25-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0030950#exec_sum									-		
Carbon Black	1333-86-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7051216#exec_sum									-		
Carbon monoxide	630-08-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5027273#exec_sum									-		
Carbon tetrachloride	56-23-5	https://aopwiki.org/stressors?utf8=%E2%9C%93&search=Carbon+tetrachloride&commit=Search&find_by_id=	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8020250#exec_sum	AOP 38 Protein Alkylation leading to Liver Fibrosis		MIE 244 Alkylation, Protein		KE 55 N/A, Cell injury/death KE 1492 Tissue resident cell activation KE 1493 Increased Pro-inflammatory mediators KE 265 Activation, Stellate cells KE 68 Accumulation, Collagen	**AO 344 N/A, Liver fibrosis**			-		
Carbon tetrafluoride	75-73-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2041757#exec_sum									-		
Carbonyl sulfide	463-58-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6023949#exec_sum									-		
Catechol	120-80-9	**AOP Links: 58, 61, 66, 107, 150, 153, 163, 175, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3020257#exec_sum	NR1I3 (CAR) suppression leading to hepatic steatosis NFE2L2/FXR activation leading to hepatic steatosis Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats PPARgamma activation leading to sarcomas in rats, mice, and hamsters Thyroperoxidase inhibition leading to altered amphibian metamorphosis Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/58 https://aopwiki.org/aops/61 https://aopwiki.org/aops/66 https://aopwiki.org/aops/107 https://aopwiki.org/aops/150 https://aopwiki.org/aops/153 https://aopwiki.org/aops/163 https://aopwiki.org/aops/175 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	456Suppression,ConstitutiveandrostanereceptorNR1I3 468Inhibition,PPARalpha 167Activation,LXR 228peroxisomeproliferatoractivatedreceptorpromoterdemethylation 478Activation,NRF2 479Activation,NR1H4 653DecreasedtestosteronebythefetalLeydigcells,IncreasedcorticosteroneDecreasedtestosteronebythefetalLeydigcells,Activationbyotherglucocorticoidreceptoragonists 715 Activation, Constitutive androstane receptor 18 Activation, AhR 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol 1028 Activation of peroxisome proliferator receptors, PPAR-gamma	https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/478 https://aopwiki.org/events/479 https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/715 https://aopwiki.org/events/18 https://aopwiki.org/events/964 https://aopwiki.org/events/1028 https://aopwiki.org/events/279 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	457Activation,SREBF1 66Activation,CHREBP 458Increased,DeNovoFAsynthesis 454Increased,Triglyceridedeformation 54UpRegulation,CD36 462UpRegulation,SCD-1 463UpRegulation,FAS 451Inhibition,Mitochondrialfattyacidbeta-oxidation 327Accumulation,Fattyacid 470UpRegulation,Acetyl-CoAcarboxylase-1(ACC-1) 465Increased,FAInflux 480Activation,SHP 227Activation,PPARα 482Decreased,DHB4/HSD17B4 451Inhibition,Mitochondrialfattyacidbeta-oxidation 483Activation,LXRalpha 878Inhibition,SREBP1c 879Activation,MTTP	**459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **505 Decreased sperm quantity / quality in the adult, Decreased fertility** **719 Increase, Adenomas/carcinomas (hepatocellular)** **947 Increase, Early Life Stage Mortality** **972 Decreased fertility, Reduced number of oocytes ovulated** **1101 Altered, Amphibian metamorphosis** **1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2018/05/31/1n1zo2kaml_Graphic_CAR_AOP_revised_May2018pptx.jpg https://aopwiki.org/system/dragonfly/production/2018/03/28/9bl0inwwpy_AOP_150_graphical_representation_March_28_2018.jpg https://aopwiki.org/system/dragonfly/production/2016/12/02/3v5qsyaove_Amphib_TPO_AOP.jpg https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg	78년생, 남성 재생불량성빈혈, 사망)	sAOP#120-80-9.jpg	- 삼성전자(화성),반도체 - 클린/엔지니어	- 불산, 황산, 질산, 과산화수소, 인산, 아세트산, IPA, 카테콜 등
Cellulose	9004-34-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3050494#exec_sum									-		

Cerium oxide	1345-13-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID10904282#exec_sum									-		
Chlorine	7782-50-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1020273#exec_sum									-		
Chlorine trifluoride	7790-91-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9088393#exec_sum									-		
CHLOROFLUOROCARBONS	11126-05-8	No AOPs available	-									-		
Chromium	7440-47-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3031022#exec_sum									-		
Chromium trioxide	1333-82-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0040125#exec_sum									-		
Chromium(III) oxide	1308-38-9	No AOPs available 191, 286, 287	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4043721#exec_sum	191 Type III iodotyrosine deiodinase (DIO3) inhibition leading to altered amphibian metamorphosis 286 Mitochondrila Complex II inhibition leading to ATP depletion associated mortality 287 Mitochondrila Complex II inhibition leading to oxidative stress associated mortality		MIE 1153 Inhibition, Deiodinase 3 MIE 1542 Mitochondrial Complex III inhibition MIE 1542 Mitochondrial Complex III inhibition		KE 1154 Increased, Triiodothyronine (T3) in tissues KE 1477 Decrease, Oxidative phosphorylation KE 40 Decrease, Mitochondrial ATP production KE 1607 Increase, Necrosis KE 1364 Increase, Reactive oxygen species KE 1608 Increase, Oxidative DNA damage KE 1365 Increase, Apoptosis	**AO 1101 Altered, Amphibian metamorphosis** **AO 350 Increase, Mortality** **AO 350 Increase, Mortality**			-		
Cobaltic-cobaltous oxide	1308-06-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8089242#exec_sum									-		
Cobaltous oxide	1307-96-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6051669#exec_sum									-		
Colophony	8050-09-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7027702#exec_sum									-		

Copper (Cu)	7440-50-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2029854#exec_sum									-		
Copper(II) oxide	1317-38-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5034488#exec_sum									-		
Cresol	o-Cresol 95-48-7 p-Cresol 106-44-5 m-Cresol 108-39-4	**AOP Links: 58, 61, 175**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8021808#exec_sum https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7021869#exec_sum https://comptox.epa.gov/dashboard/dsstoxdb/results?search=108-39-4#exec_sum	NR1I3 (CAR) suppression leading to hepatic steatosis NFE2L2/FXR activation leading to hepatic steatosis Thyroperoxidase inhibition leading to altered amphibian metamorphosis	https://aopwiki.org/aops/58 https://aopwiki.org/aops/61 https://aopwiki.org/aops/175	456Suppression,Constitutiveandrostanereceptor,NR1I3 468Inhibition,PPARalpha 167Activation,LXR 228peroxisomeproliferatoractivatedreceptorpromoterdemethylation 478Activation,NRF2 479Activation,NR1H4 279 Thyroperoxidase, Inhibition	https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/478 https://aopwiki.org/events/479 https://aopwiki.org/events/279	457Activation,SREBF1 66Activation,ChREBP 458Increased,DeNovoFAsynthesis 454Increased,Triglyceridefomation 54UpRegulation,CD36 462UpRegulation,SCD-1 463UpRegulation,FAS 451Inhibition,Mitochondrialfattyacidbeta-oxidation 327Accumulation,Fattyacid 470UpRegulation,Acetyl-CoAcarboxylase-1(ACC-1) 465Increased,FAInflux 480Activation,SHP 227Activation,PPARα 482Decreased,DHB4/HSD17B4 451Inhibition,Mitochondrialfattyacidbeta-oxidation	**459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **1101 Altered, Amphibian metamorphosis**	https://aopwiki.org/system/dragonfly/production/2016/12/02/3y5qsyaove_Amphib_TPO_AOP.jpg	84년생, 여성 (다발성경화증)	sAOPW95-48-7.jpg sAOPW106-44-5.jpg	- 삼성전자(기흥),반도체 - CMP, 세정, Metal, 포토, CVD, 식각, 검사/오퍼레이터	- 아세톤, 신너, 벤젠, 톨루엔, 크실렌, 페놀, 크레졸, 2-맥톡시에탄올, 황산 등
Crystalline silica (Cristobalite)	14464-46-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5041801#exec_sum	silica nanoparticles????								-		
Crystalline silica (Quartz)	14808-60-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3032040#exec_sum	silica nanoparticles????								-		
Cumene	98-82-8	AOP Links: 153, 200		153 200	Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats Estrogen receptor activation leading to breast cancer	MIE 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol MIE 1181 Activation, Estrogen receptor		KE 965 reduction in ovarian granulosa cells synthesis of estradiol, Reduced steroidogenic production of estradiol in granulosa cells KE 966 Reduced Estradiol in Circulation, Reduced steroidogenic production of estradiol in granulosa cells leading to decreased estradiol in circulation KE 967 Decreased positive estrogenic feedback on hypothalamus, Reduced estradiol in circulation decreases estrogen concentration at hypothalamus KE 968 Decreased Kisspeptin release from neurons in AVPV, Decreased hypothalamic estrogen reduces kisspeptinergic neuron response KE 969 Decreased GnRH Release, Decreased Kisspeptin stimulation of GnRH neurons KE 970 Decreased LH release from Anterior Pituitary, Decreased GnRH stimulation of Anterior Pituitary Gonadotrophs KE 971 Ovulation of oocytes Reduced, Delayed, or Blocked, Decrease or delay in LH surge required for ovulation KE 1182 Increase, Cell Proliferation (Epithelial Cells) KE 1183 Decreased, Apoptosis (Epithelial Cells) KE 177 N/A, Mitochondrial dysfunction 1 KE 1088 Increased, Oxidative Stress KE 1187 Increased, ER binding to DNA (classical pathway) KE 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) KE 1189 Increased, Proliferation (Endothelial cells) KE 1190 Increased, Migration (Endothelial Cells)	AO 972 Decreased fertility, Reduced number of oocytes ovulated AO 1193 N/A, Breast Cancer		-	sAOPW98-82-8.jpg		
Cupric sulfide	1317-40-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0061666#exec_sum									-		

Cuprous selenide	20405-64-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6066606#exec_sum									-		
Cyclohexanone	108-94-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6020359#exec_sum									aAOP#108-94-1.jpg		
Cyclohexyl methacrylate	101-43-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7051507#exec_sum									-		
Cyclohexylamine	108-91-8	No AOPs available										aAOP#108-91-8.jpg		
Cyclotetrasiloxane, 2, 4, 6, 8-tetramethyl-2-(3-oxiranylmethoxypropyl)-	61614-55-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID50886452#exec_sum									-	Carcinogenicity	
Decaborane	17702-41-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8088049#exec_sum									-		

Diborane	19287-45-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9024938#exec_sum									-		
Dibutyl ether	142-96-1	No AOPs available 95	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1022007#exec_sum	95 Ether-a-go-go (ERG) voltage-gated potassium channel inhibition leading to reduced survival		MIE 593 Inhibition, Ether-a-go-go (ERG) voltage-gated potassium channel		KE 585 Decreased, Sodium conductance 1 KE 586 Reduced, swimming speed KE 587 Reduced, feeding 1 KE 588 Increased, predation	**AO 592 Reduced, survival**			-		
Dichloro methane	75-09-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0020868#exec_sum									sAOP#75-09-2.jpg		
Dichloro silane	4109-96-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1052082#exec_sum									-		
Diethanolamine	111-42-2	**AOP Links: 58, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3021932#exec_sum	NR1I3 (CAR) suppression leading to hepatic steatosis Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/58 https://aopwiki.org/aops/200	456 Suppression, Constitutive androstane receptor, NR1I3 468 Inhibition, PPAR alpha 167 Activation, LXR 228 peroxisome proliferator activated receptor promoter demethylation 1181 Activation, Estrogen receptor	https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/1181	457 Activation, SREBF1 66 Activation, ChREBP 458 Increased, De Novo FA synthesis 454 Increased, Triglyceride formation 54 Up Regulation, CD36 462 Up Regulation, SCD-1 463 Up Regulation, FAS 451 Inhibition, Mitochondrial fatty acid beta-oxidation 327 Accumulation, Fatty acid 470 Up Regulation, Acetyl-CoA carboxylase-1 (ACC-1) 465 Increased, FA Influx 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells)	**459 Increased, Liver Steatosis** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#111-42-2.jpg		
Diethyl oxalate	95-92-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2044472#exec_sum									sAOP#95-92-1.jpg		
Diethylene glycol dimethyl ether	111-96-6	No AOPs available 95	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1024671#exec_sum	95 Ether-a-go-go (ERG) voltage-gated potassium channel inhibition leading to reduced survival		MIE 593 Inhibition, Ether-a-go-go (ERG) voltage-gated potassium channel NVS_ENZ_rMAOAP BSK_hDFCGF Collagen III_down		KE 585 Decreased, Sodium conductance 1 KE 586 Reduced, swimming speed KE 587 Reduced, feeding 1 KE 588 Increased, predation COL3A1	**AO 592 Reduced, survival**			sAOP#111-96-6.jpg		
Diethylene glycol monobutyl ether	112-34-5	**AOP Links: 95, 153, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8021519#exec_sum	Ether-a-go-go (ERG) voltage-gated potassium channel inhibition leading to reduced survival Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/153 https://aopwiki.org/aops/200	MIE 593 Inhibition, Ether-a-go-go (ERG) voltage-gated potassium channel 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol 1181 Activation, Estrogen receptor	https://aopwiki.org/events/964 https://aopwiki.org/events/1181	KE 585 Decreased, Sodium conductance 1 KE 586 Reduced, swimming speed KE 587 Reduced, feeding 1 KE 588 Increased, predation 593 Inhibition, Ether-a-go-go (ERG) voltage-gated potassium channel 965 reduction in ovarian granulosa cells synthesis of estradiol, Reduced steroidogenic production of estradiol in granulosa cells 966 Reduced Estradiol in Circulation, Reduced steroidogenic production of estradiol in granulosa cells leading to decreased estradiol in circulation 967 Decreased positive estrogenic feedback on hypothalamus, Reduced estradiol in circulation decreases estrogen concentration at hypothalamus 968 Decreased Kisspeptin release from neurons in AVPV, Decreased hypothalamic estrogen reduces kisspeptinergic neuron response 969 Decreased GnRH Release, Decreased Kisspeptin stimulation of GnRH neurons 970 Decreased LH release from Anterior Pituitary, Decreased GnRH stimulation of Anterior Pituitary Gonadotrophs 971 Ovulation of oocytes Reduced, Delayed, or Blocked, Decrease or delay in LH surge required for ovulation 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway)	**AO 592 Reduced, survival** **972 Decreased fertility, Reduced number of oocytes ovulated** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#112-34-5.jpg		

Diethylsilane	542-91-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID20870601#exec_sum									-		
Difluoromethane	75-10-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID6029597#exec_sum									-		
Dimethyl acetamide	127-19-5	**AOP Links: 60, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID5020699#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/60 https://aopwiki.org/aops/200	245 Activation, PXR/SXR 1181 Activation, Estrogen recepto	https://aopwiki.org/events/245 https://aopwiki.org/events/1181	471 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36 465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) [illegible]	**459 Increased, Liver Steatosis** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/114Aop-200.png		sAOP#127-19-5.jpg		
Dimethyl sulfoxide	67-68-5	**AOP Links: 150, 153**	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID2021735#exec_sum	Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats	https://aopwiki.org/aops/150 https://aopwiki.org/aops/153	18 Activation, AhR 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol	https://aopwiki.org/events/18 https://aopwiki.org/events/964	944 dimerization, AHR/ARNT 945 reduced dimerization, ARNT/HIF1-alpha 948 reduced production, VEGF 110 Impairment, Endothelial network 317 Altered, Cardiovascular development/function 965 reduction in ovarian granulosa cells synthesis of estradiol, Reduced steroidogenic production of estradiol in granulosa cells 966 Reduced Estradiol in Circulation, Reduced steroidogenic production of estradiol in granulosa cells leading to decreased estradiol in circulation 967 Decreased positive estrogenic feedback on hypothalamus, Reduced estradiol in circulation decreases estrogen concentration at hypothalamus 968 Decreased Kisspeptin release from neurons in AVPV, Decreased hypothalamic estrogen reduces kisspeptinergic neuron response 969 Decreased GnRH Release, Decreased Kisspeptin stimulation of GnRH neurons 970 Decreased LH release from Anterior Pituitary, Decreased GnRH stimulation of Anterior Pituitary Gonadotrophs 971 Ovulation of oocytes Reduced, Delayed, or Blocked, Decrease or delay in LH surge required for ovulation	**947 Increase, Early Life Stage Mortality** **972 Decreased fertility, Reduced number of oocytes ovulated**	https://aopwiki.org/system/dragonfly/production/2018/03/28/9ktsinwepy_AOP_150_graphical_representation_March_28_2018.jpg		sAOP#67-68-5.jpg		
Dimethylamine borane	74-94-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID7052494#exec_sum									-		
Dimethylformamide	68-12-2	**AOP Links: 58**	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID6020515#exec_sum	NR1I3 (CAR) suppression leading to hepatic steatosis	https://aopwiki.org/aops/58	456 Suppression, Constitutive androstane receptor, NR1I3 468 Inhibition, PPAR alpha 167 Activation, LXR 228 peroxisome proliferator activated receptor promoter demethylation	https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228	457 Activation, SREBF1 66 Activation, ChREBP 458 Increased, De Novo FA synthesis 454 Increased, Triglyceride formation 54 Up Regulation, CD36 462 Up Regulation, SCD-1 463 Up Regulation, FAS 451 Inhibition, Mitochondrial fatty acid beta-oxidation 327 Accumulation, Fatty acid 470 Up Regulation, Acetyl-CoA carboxylase-1 (ACC-1) 465 Increased, FA Influx	**459 Increased, Liver Steatosis**			sAOP#68-12-2.jpg		
Dodecyl and tetradecyl glycidyl ethers	2461-18-9 38954-75-5	No AOPs available 95	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID0025494#exec_sum https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID6086593#exec_sum	95 Ether-a-go-go (ERG) voltage-gated potassium channel inhibition leading to reduced survival		MIE 593 Inhibition, Ether-a-go-go (ERG) voltage-gated potassium channel TOX21_p53_BLA_p5_ratio TOX21_p53_BLA_p2_viability		KE 585 Decreased, Sodium conductance 1 KE 586 Reduced, swimming speed KE 587 Reduced, feeding 1 KE 588 Increased, predation TP53	**AO 592 Reduced, survival**			sAOP#2461-18-9.jpg		
Epichlorohydrin	106-89-8	**AOP Links: 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID1020566#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/187	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration	**1136 Impaired recruitment, Population trajectory**			sAOP#106-89-8.jpg		
EPOXY RESINS	61788-97-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchtxt=DTXSID0052887#exec_sum									-		

Ethanol	64-17-5	https://aopwiki.org/stressors?utf8=%E2%9C%93&search=Ethanol&commit=Search&find_by_id=	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9020584#exec_sum	AOP 260 CYP2E1 activation and formation of protein adducts leading to neurodegeneration		ME 1508 CYP2E1 Activation ME 1509 Protein Adduct Formation		KE 1510 Oxidative Stress in Brain KE 1511 Lipid Peroxidation KE 1512 Unfolded Protein Response KE 1513 General Apoptosis	**AO 1514 Neurodegeneration**			-		
Ethanolamine	141-43-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6022000#exec_sum									sAOP#141-43-5.jpg		
Ethyl acetate	141-78-6	**AOP Links: 60, 200** **https://aopwiki.org/stressors?utf8=%E2%9C%93&search=Ethyl+acetate&commit=Search&find_by_id=**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1022001#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/60 https://aopwiki.org/aops/200	245 Activation, PXR/SXR 1181 Activation, Estrogen receptor	https://aopwiki.org/events/245 https://aopwiki.org/events/1181	71 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36<465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia	**459 Increased, Liver Steatosis** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#141-78-6.jpg		
Ethyl benzene	100-41-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3020596#exec_sum									-		
Ethyl lactate	97-64-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6029127#exec_sum									sAOP#97-64-3.jpg		
Ethyl silicate	11099-06-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4027731#exec_sum									-		
Ethyl-3-ethoxy propionate	763-69-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0027309#exec_sum									-		
Ethylene	74-85-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1026370#exec_sum									-		
Ethylene glycol	107-21-1	**AOP Links: 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8020597#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin 1181 Activation, Estrogen receptor	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells)	**1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg	78년생, 여성 (불임)	sAOP#107-21-1.jpg	- 삼성전자(기흥),반도체 - EDS/오피레이터 - 1997.2/2012.4	- 2013.7/2017.2
Ethylene oxide	75-21-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0020600#exec_sum							60 Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis 95 Ether-a-go-go (ERG) voltage-gated potassium channel inhibition leading to reduced survival 187 Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage ME 1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K	82년생, 여성 재생불량성빈혈)	-	- 삼성전자(온양),반도체 - MBT/오피레이터 - 2000.7/2003.3	- 2010.5/2010.9 - 2011.4/2014.11

FLUORIDES	16984-48-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9049617#exec_sum									-			
Fluorine	7782-41-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3024106#exec_sum									-			
Formaldehyde	50-00-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7020637#exec_sum								85년생, 여성 (백혈병, 사망)	-	- 삼성전자(기흥) 반도체 - 확산,식각/오퍼레이터 - 2003.1/2005.6	- 2007.6/2009.11 - 2010.1/2014.8
Gallium	7440-55-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8064696#exec_sum									-			
Gallium arsenide	1303-00-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2023779#exec_sum									-			
Gallium nitride	25617-97-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2067111#exec_sum									-			
Gallium oxide	12024-21-4 12653-62-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9031359#exec_sum https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6092558 3#exec_sum									-			
Gallium phosphide	12063-98-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6089418 4#exec_sum									-			
Gallium trichloride	13450-90-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8031360#exec_sum									-			
gamma-Butyrolactone	96-48-0	No AOPs available 160, 256	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6020224#exec_sum	160 Ionotropic gamma-aminobutyric acid receptor activation mediated neurotransmission inhibition leading to mortality 256 Inhibition of mitochondrial DNA polymerase gamma leading to kidney toxicity		MIE 762 Activation, ionotropic GABA Receptor chloride channel MIE 1481 Inhibition of mitochondrial DNA polymerase gamma (Pol gamma) ATG_RORg_TRANS_up TOX21_p53_BLA_p2_ch2 ATG_VDR_TRANS_up BSK_3C_Vis_down		KE 1012 Increased, Inhibitory postsynaptic potential KE 1014 Induction, Somatic muscle paralysis KE 761 Increased, Chloride conductance KE 1015 Increased, Neuronal synaptic inhibition KE 1016 Inhibition, Feeding KE 1482 Depletion, mtDNA KE 1483 Dysfunction, Mitochondria KE 709 Increase, Cytotoxicity (renal tubular cell) RORC VDR	**AO 351 Increased Mortality** **AO 814 Occurrence, Kidney toxicity**			aOPW96-48-0.jpg	
Germanium	7440-56-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8052483#exec_sum									-			
Germanium dioxide	1310-53-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0051653#exec_sum									-			
Germanium telluride	12025-39-7 12240-55-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3065293#exec_sum									-			
Germanium tetrachloride	10038-98-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1044350#exec_sum									-			
Germanium tetrafluoride	7783-58-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1064829#exec_sum									-			
Germanium tetrahydride	7782-65-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7052521#exec_sum									-			

Glycerol	56-81-5	**AOP Links: 66, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9020663#exec_sum	Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/66 https://aopwiki.org/aops/200	653 Decreased testosterone by the fetal Leydig cells, Increased corticosterone 654 Decreased testosterone by the fetal Leydig cells, Activation by other glucocorticoid receptor agonists 1181 Activation, Estrogen receptor	https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/1181	655 Decreased testosterone by the fetal Leydig cells, Increased COUP-TFII in fetal Leydig cells 656 Decreased number and function of adult Leydig cells, Decreased COUP-TFII stem Leydig cells 657 Decreased testosterone by the fetal Leydig cells, Dysgenesis of fetal Leydig cells 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts 1198 Activation, Macrophages 1213 Increased, Angiogenesis 1239 Altered, Gene Expression 1240 Altered, Protein Production 1241 Increased, Motility	**505 Decreased sperm quantity / quality in the adult, Decreased fertility** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#56-81-5.jpg		
Gold	7440-57-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3064697#exec_sum									-		
Hafnium	7440-58-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8064688#exec_sum									-		
Helium	7440-59-7 71086-78-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7036402#exec_sum									-		
Heptane	142-82-5	**AOP Links: 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6024127#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/187	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g, des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration	**1136 Impaired recruitment, Population trajectory**			sAOP#142-82-5.jpg		
Hexachlorodisilane	13465-77-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0065488#exec_sum									-		
Hexafluoro-1,3-butadiene	685-63-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4060991#exec_sum									-	Carcinogenicity	
Hexafluoroethane	76-16-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2041915#exec_sum									-		
Hexamethyldisilazane	999-97-3	**AOP Links: 66, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9999-97-3#exec_sum	Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/66 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	653DecreasedtestosteronebythefetalLeydigcells,IncreasedcorticosteronE 654DecreasedtestosteronebythefetalLeydigcells,ActivationbyothergluccocorticoidreceptoragonistS 1134IreversibleinhibitionofhepaticVKORbybindingofARattyrosine139,FailuretocyclevitaminKepoxidetovitaminKtoformvitaminKhydroquinone 1138UncouplingofoxidativephosphorylationReducedabilitytogenerateATP 1169AnticoagulantrodenticideinterfereswithcarboxylationofGlaproteinsinbone,Impairmentofpost-translationalmodification(carboxylation)ofosteocalcin 1181 Activation, Estrogen receptor	https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	655DecreasedtestosteronebythefetalLeydigcells,IncreasedCOUP-TFIIinfetalLeydigcells 656DecreasednumberandfunctionofadultLeydigcells,DecreasedCOUP-TFIIstemLeydigcells 657DecreasedtestosteronebythefetalLeydigcells,DysgenesisoffetalLeydigcells 1122Undercarboxylatedclottingfactorswillnotassembleoncellsurfacestoformclot,Failureofsecondaryhemostasis 1130Failureinvascularrepairmechanisms,UnresolvedbloodloSS(hemorrhage) 1131Failureingamma-glutamylcarboxylationofclottingfactorsII,VII,XandX,Undercarboxylationofclottingfactors(e.g,des-gamma-carboxyprothrombin) 1132BloodlossanddevelopmentofanemiaImpairedoxygendeliveryandnutrientdeliverytotissue,impairedcarbondioxideandwasteproductremoval 1133Hemostasis,DepletionfromBloodoffullyfunctionalcarboxylatedclottingfactors 1135ReducedfitnessorevenmortalityAcidosis,hypovolemicshockandorgandysfunction 1151OsteoporosisandvascularcalcificationBonedeterioration 1182increase,CellProliferation(EpithelialCells) 1183DecreasedApoptosis(EpithelialCells) 177N/A,MitochondrialdysfunctionI 1088Increased,OxidativeStress 1187Increased,ERbindingtoDNA(classicalpathway) 1188Increased,ERbindingtoT.F.toDNA(non-classicalpathway) 1189Increased,Proliferation(EndothelialCells) 1190Increased,Migration(EndothelialCells) 1191Increased,Non-genomicsignaling 1192Increased,DuctalHyperplasia 1194increase,DNAdamage	**505 Decreased sperm quantity / quality in the adult, Decreased fertility** **1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#999-97-3.jpg		
Hydrated silica	112926-00-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9029851#exec_sum									-		
Hydrazine	302-01-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3020702#exec_sum									-		
Hydrogen	1333-74-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9029643#exec_sum									-		
Hydrogen bromide	10035-10-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0029713#exec_sum									-		

Hydrogen chloride	7647-01-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2020711#exec_sum								59년생, 남성 (백혈병, 사망)	-	- 삼성전자(화성,기흥),반도체 - 설비PM 관리, 인사, 노무/협력업체 관리소장 - 2003.1/2012.8	- 2013.7/2014.10 - 2015.8/2017.11
Hydrogen fluoride	7664-39-3 24993-08-6 74635-81-2 74635-82-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1049641#exec_sum								69년생, 남성 (다발성신경병증)	-	- 삼성전자(화성),반도체 - 종합폐수처리장 배관-덕트 시공 - 2012.4/2012.5	- 2013.1/2013.2 - 2013.5/2014.12
Hydrogen peroxide	7722-84-1	https://aopwiki.org/stressors?utf8=%E2%9C%93&search=Hydrogen+peroxide&commit=Search&find_by_id=	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2020715#exec_sum	AOP 296 Oxidative DNA damage leading to chromosomal aberrations and mutations		MIE 1634 Increase, Oxidative damage to DNA		KE 155 N/A, Inadequate DNA repair KE 1635 Increase, DNA strand breaks	**AO 185 Increase, Mutations** **AO 1636 Increase, Chromosomal aberrations**		73년생, 남성 (백혈병, 사망)	-	- 하이닉스(청주),반도체 - IMP/엔지니어	- 아르신, 포스핀, 베소, 삼산화안티몬, 포름알데히드, 아르곤, IPA, 과산화수소 등 - 자외방사선
Hydrogen selenide	7783-07-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID20872822#exec_sum									-		
Hydroquinone	123-31-9	**AOP Links: 58, 61, 66, 107, 150, 153, 163, 175, 187, 200**		58	NR1I3 (CAR) suppression leading to hepatic steatosis	MIE 456 Suppression, Constitutive androstane receptor, NR1I3 MIE 468 Inhibition, PPAR alpha MIE 167 Activation, LXR MIE 228 peroxisome proliferator activated receptor promoter demethylation		KE 457 Activation, SREBF1 KE 66 Activation, CHREBP KE 458 Increased, De Novo FA synthesis KE 454 Increased, Triglyceride formation KE 54 Up Regulation, CD36 KE 462 Up Regulation, SCD-1 KE 463 Up Regulation, FAS KE 451 Inhibition, Mitochondrial fatty acid beta-oxidation KE 327 Accumulation, Fatty acid KE 470 Up Regulation, Acetyl-CoA carboxylase-1 (ACC-1) KE 465 Increased, FA Influx	AO 459 Increased, Liver Steatosis		-	sAOPW123-31-9.jpg		
Hydroquinone				61	NFE2L2/FXR activation leading to hepatic steatosis	MIE 478 Activation, NRF2 MIE 479 Activation, NR1H4		KE 480 Activation, SHP KE 227 Activation, PPARα KE 482 Decreased, DHB4/HSD17B4 KE 451 Inhibition, Mitochondrial fatty acid beta-oxidation KE 483 Activation, LXR alpha KE 878 Inhibition, SREBP1c KE 879 Activation, MTTP KE 880 Increased, ApoB100 KE 881 Increased, Triglyceride KE 458 Increased, De Novo FA synthesis	AO 459 Increased, Liver Steatosis		-	sAOPW123-31-9.jpg		
Hydroquinone				66	Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis	MIE 653 Decreased testosterone by the fetal Leydig cells, Increased corticosterone MIE 654 Decreased testosterone by the fetal Leydig cells, Activation by other glucocorticoid receptor agonists		KE 655 Decreased testosterone by the fetal Leydig cells, Increased COUP-TFII in fetal Leydig cells KE 656 Decreased number and function of adult Leydig cells, Decreased COUP-TFII stem Leydig cells KE 657 Decreased testosterone by the fetal Leydig cells, Dysgenesis of fetal Leydig cells	AO 505 Decreased sperm quantity / quality in the adult, Decreased fertility		-	sAOPW123-31-9.jpg		
Hydroquinone				107	Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat	MIE 715 Activation, Constitutive androstane receptor		KE 1214 Altered gene expression specific to CAR activation, Hepatocytes KE 716 Increase, Mitogenic cell proliferation (hepatocytes) KE 774 Increase, Preneoplastic foci (hepatocytes)	AO 719 Increase, Adenomas/carcinomas (hepatocellular)		-	sAOPW123-31-9.jpg		
Hydroquinone				150	Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF	MIE 18 Activation, AhR		KE 944 dimerization, AHR/ARNT KE 945 reduced dimerization, ARNT/HIF1-alpha KE 948 reduced production, VEGF KE 110 Impairment, Endothelial network KE 317 Altered, Cardiovascular development/function	AO 947 Increase, Early Life Stage Mortality		-	sAOPW123-31-9.jpg		
Hydroquinone				153	Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats	MIE 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol		KE 965 reduction in ovarian granulosa cells synthesis of estradiol, Reduced steroidogenic production of estradiol in granulosa cells KE 966 Reduced Estradiol in Circulation, Reduced steroidogenic production of estradiol in granulosa cells leading to decreased estradiol in circulation KE 967 Decreased positive estrogenic feedback on hypothalamus, Reduced estradiol in circulation decreases estrogen concentration at hypothalamus KE 968 Decreased Kisspeptin release from neurons in AVPV, Decreased hypothalamic estrogen reduces kisspeptinergic neuron response KE 969 Decreased GnRH Release, Decreased Kisspeptin stimulation of GnRH neurons KE 970 Decreased LH release from Anterior Pituitary, Decreased GnRH stimulation of Anterior Pituitary Gonadotrophs KE 971 Ovulation of oocytes Reduced, Delayed, or Blocked, Decrease or delay in LH surge required for ovulation	AO 972 Decreased fertility, Reduced number of oocytes ovulated		-	sAOPW123-31-9.jpg		
Hydroquinone				163	PPARgamma activation leading to sarcomas in rats, mice, and hamsters	MIE 1028 Activation of specific nuclear receptors, PPAR-gamma activation		KE 1029 Increased, adipogenesis KE 1032 Increased, secretion of local growth factors KE 1033 Increased, proliferation of mesenchymal cells KE 1034 Increased, IGF-1 (mouse) KE 1035 Increased, Firbrosarcoma KE 1036 Increased, liposarcoma KE 1037 Increased, hemagiosarcoma	-		-	sAOPW123-31-9.jpg		

Hydroquinone				175	Thyroperoxidase inhibition leading to altered amphibian metamorphosis	MIE 279 Thyroperoxidase, Inhibition		KE 277 Thyroid hormone synthesis, Decreased KE 281 Thyroxine (T4) in serum, Decreased KE 1093 Decreased, Thyroxine (T4) in tissues KE 1116 Decreased, Triiodothyronine (T3) in tissues	AO 1101 Altered, Amphibian metamorphosis		-	sAOP#123-31-9.jpg		
Hydroquinone				187	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	MIE 1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone MIE 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP MIE 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin		KE 1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis KE 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) KE 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) KE 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal KE 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors KE 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction KE 1151 Osteoporosis and vascular calcification, Bone deterioration	AO 1136 Impaired recruitment , Population trajectory		-	sAOP#123-31-9.jpg		
Hydroquinone				200	Estrogen receptor activation leading to breast cancer	MIE 1181 Activation, Estrogen receptor		KE 1182 Increase, Cell Proliferation (Epithelial Cells) KE 1183 Decreased, Apoptosis (Epithelial Cells) KE 177 N/A, Mitochondrial dysfunction 1 KE 1088 Increased, Oxidative Stress KE 1187 Increased, ER binding to DNA (classical pathway) KE 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) KE 1189 Increased, Proliferation (Endothelial cells) KE 1190 Increased, Migration (Endothelial Cells) KE 1191 Increased, Non-genomic signaling KE 1192 Increased, Ductal Hyperplasia KE 1194 Increase, DNA damage KE 1195 modulation, Extracellular Matrix Composition KE 1196 Increased, Invasion KE 1197 Activation, Fibroblasts KE 1198 Activation, Macrophages KE 1213 Increased, Angiogenesis KE 1239 Altered, Gene Expression KE 1240 Altered, Protein Production KE 1241 Increased, Motility KE 1242 Increased, Second Messenger Production	AO 1193 N/A, Breast Cancer		-	sAOP#123-31-9.jpg		
Hydroxyl amine	7803-49-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7041043#exec_sum									-		
Iridium	7440-74-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8052485#exec_sum									-		
Iridium arsenide	1303-11-3	**AOP Links: 60, 150, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5023825#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/60 https://aopwiki.org/aops/150 https://aopwiki.org/aops/200	245 Activation, PXR/SXR 18 Activation, AhR 1181 Activation, Estrogen receptor	https://aopwiki.org/events/245 https://aopwiki.org/events/18 https://aopwiki.org/events/1181	471Inhibition,FoxA2Inhibition,FoxA2 179Decreased,Mitochondrialfattyacidbeta-oxidation 472DownRegulation,CPT1A 474DownRegulation,HMGCS2 462UpRegulation,SCD-1 54UpRegulation,CD36 465Increased,FAInflux 477Decreased,Ketogenesis 454Increased,Triglyceridedeformation 327Accumulation,Fattyacid 944dimerization,AHR/ARNT 945reducediddimerization,ARNT/HIF1-alpha 948reducedproduction,VEGF 110Impairment,Endothelialnetwork 317Altered,Cardiovasculardevelopment/function 1182Increase,CellProliferation(EpithelialCells) 1183Decreased,Apoptosis(EpithelialCells) 177N/A,Mitochondrialdysfunction1 1088Increased,Oxidativestress 1187Increased,ERbindingtoDNA(classicalpathway) 1188Increased,ERbindingtoT.F.toDNA(non-classicalpathway) 1189Increased,Proliferation(Endothelialcells) 1190Increased,Migration(EndothelialCells)	**459 Increased, Liver Steatosis** **947 Increase, Early Life Stage Mortality** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2018/03/28/lhbinwwpy_AOP_150_graphical_representation_March_28_2018.jpg https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#1303-11-3.jpg		
Iridium nitride	25617-98-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7067112#exec_sum									-		
Iridium phosphide	22398-80-7	**AOP Links: 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3031444#exec_sum	Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/200	1181 Activation, Estrogen receptor	https://aopwiki.org/events/1181	1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts 1198 Activation, Macrophages 1213 Increased, Angiogenesis 1239 Altered, Gene Expression 1240 Altered, Protein Production 1241 Increased, Motility 1242 Increased, Second Messenger Production	**1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		-		
Isopropyl alcohol	67-63-0	**AOP Links: 61, 153, 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7020762#exec_sum	NFE2L2/FXR activation leading to hepatic steatosis Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/61 https://aopwiki.org/aops/153 https://aopwiki.org/aops/187	478Activation,NRF2 479Activation,NR1H4 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol 1134IrreversibleinhibitionofhepaticVKORbybindingofARattyrosine139,FailuretocyclevitaminKepoxidetovitaminKtoformvitaminKhydroquinone 1138UncouplingofoxidativephosphorylationReducedabilitytogenerateATP 1169AnticoagulantrodenticideinterfereswithcarboxylationofGlaproteinsinbone,ImpairmentofpostrtranslationalmodificationcarboxylationofosteocalcIn	https://aopwiki.org/events/478 https://aopwiki.org/events/479 https://aopwiki.org/events/964 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	480Activation,SHP 227Activation,PPARα 482Decreased,DHB4/HSD17B4 451Inhibition,Mitochondrialfattyacidbeta-oxidation 483Activation,LXRalpha 878Inhibition,SREBP1c 879Activation,MTTP 880Increased,Apo8100 881Increased,Triglyceride 458Increased,DeNovoFAsynthesis 965reductioninovariangranulosacellssynthesisofestradiol,Reducedsteroidogenicproductionofestradiolingranulosacells 966ReducedestradiolinCirculation,Reducedsteroidogenicproductionofestradiolingranulosacellsleadingtodecreasedestradiolincirculation 967Decreasedpositiveestrogenicfeedbackonhypothalamus,Reducedestradiolincirculationdecreasesestrogenconcentrationathypothalamus 968DecreasedKisspeptinreleasefromneuronsinAVPV,Decreasedhypothalamicestrogenreduces kisspeptinergineuronresponse 969DecreasedGnRHRelease,DecreasedKisspeptinstimulationofGnRHneurons 970DecreasedLHreleasefromAnteriorPituitary,DecreasedGnRHstimulationofAnteriorPituitaryGonadotrophs 971Ovulationofoocytes Reduced,Delayed,orBlocked,Decreaseordelayin LHsurgerequiredforovulation 1122Undercarboxylatedclottingfactorswillnotassembleoncellsurfacestoformclot,Failureofsecondaryhemostasis	**459 Increased, Liver Steatosis** **972 Decreased fertility, Reduced number of oocytes ovulated** **1136 Impaired recruitment, Population trajectory**		85년생, 여성 (백혈병, 사망)	sAOP#67-63-0.jpg	- 삼성전자(기흥) 반도체 - 화산,식각/오퍼레이터	- 벤젠, 톨산, 황산, IPA, 아르신, 포스핀, 과산화수소, 암모니아, 포름알데히드 등 - 전리 방사선

Lead	7439-92-1	https://aopwiki.org/stressors?utf8=%E2%9C%93&search=Lead&commit=Search&find_by_id=	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2024161#exec_sum	AOP 12 Chronic binding of antagonist to N-methyl-D-aspartate receptors (NMDARs) during brain development leads to neurodegeneration with impairment in learning and memory in aging		MIE 201 Binding of antagonist, NMDA receptors		KE 195 Inhibition, NMDARs KE 52 Decreased, Calcium influx KE 381 Reduced levels of BDNF KE 55 N/A, Cell injury/death KE 188 N/A, Neuroinflammation	**AO 352 N/A, Neurodegeneration** **AO 341 Impairment, Learning and memory**		76년생, 여성 (재생불량성빈혈)	-	- 삼성전자(기흥,온양),반도체 - 트윈폼, 솔더링/오퍼레이터 - 1993.12/1999.4	- 2011.2/2012.4
Lead titanate	12060-00-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID109396#exec_sum									-		
Lead zirconate titanate	12626-81-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0089391#exec_sum									-		
Lead(II) sulfide	1314-87-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0025498#exec_sum									-		
Lead(II) telluride	1314-91-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5061663#exec_sum									-		
Manganese(II) oxide	1344-43-0	No AOPs available 190 202 265	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5042110#exec_sum	190 Type II iodothyronine deiodinase (DIO2) inhibition leading to altered amphibian metamorphosis 202 Inhibitor binding to topoisomerase II leading to infant leukaemia 265 D1 protein blockage leading to photosystem II (PSII)-inhibition associated growth reduction		MIE 1002 Inhibition, Deiodinase 2 MIE 1252 Binding to (interferes with) topoisomerase II enzyme MIE 1516 Increase, D1 protein blockage		KE 1116 Decreased, Triiodothyronine (T3) in tissues KE 1461 DNA double-strand break KE 1253 MLL chromosomal translocation KE 1517 Decrease, Photosystem II activity KE 1475 Decrease, Photosynthesis KE 1476 Decrease, Glycolysis KE 40 Decrease, Mitochondrial ATP production	**AO 1101 Altered, Amphibian metamorphosis** **AO 1254 Infant leukaemia** **KE 1521 Decrease, Growth**			-		
Manganese(III) oxide	1317-34-6	No AOPs available 191 286 287	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9089384#exec_sum	191 Type III iodotyrosine deiodinase (DIO3) inhibition leading to altered amphibian metamorphosis 286 Mitochondrila Complex III inhibition leading to ATP depletion associated mortality 287 Mitochondrila Complex III inhibition leading to oxidative stress associated mortality		MIE 1153 Inhibition, Deiodinase 3 MIE 1542 Mitochondrial Complex III inhibition MIE 1542 Mitochondrial Complex III inhibition		KE 1154 Increased, Triiodothyronine (T3) in tissues KE 1477 Decrease, Oxidative phosphorylation KE 40 Decrease, Mitochondrial ATP production KE 1607 Increase, Necrosis KE 1364 Increase, Reactive oxygen species KE 1608 Increase, Oxidative DNA damage KE 1365 Increase, Apoptosis	**AO 1101 Altered, Amphibian metamorphosis** **AO 350 Increase, Mortality** **AO 350 Increase, Mortality**			-		
Melamine	108-78-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6020804#exec_sum									sAOP#108-78-1.jpg		
Mercuric telluride	12068-90-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3065245#exec_sum									-		
Mercury(II) selenide	20601-83-6	No AOPs available 190 202 265	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8066630#exec_sum	190 Type II iodothyronine deiodinase (DIO2) inhibition leading to altered amphibian metamorphosis 202 Inhibitor binding to topoisomerase II leading to infant leukaemia 265 D1 protein blockage leading to photosystem II (PSII)-inhibition associated growth reduction		MIE 1002 Inhibition, Deiodinase 2 MIE 1252 Binding to (interferes with) topoisomerase II enzyme MIE 1516 Increase, D1 protein blockage		KE 1116 Decreased, Triiodothyronine (T3) in tissues KE 1461 DNA double-strand break KE 1253 MLL chromosomal translocation KE 1517 Decrease, Photosystem II activity KE 1475 Decrease, Photosynthesis KE 1476 Decrease, Glycolysis KE 40 Decrease, Mitochondrial ATP production	**AO 1101 Altered, Amphibian metamorphosis** **AO 1254 Infant leukaemia** **KE 1521 Decrease, Growth**			-		
Methane	74-82-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8025545#exec_sum									-		

Methanesulfonic acid	75-75-2	No AOPs available 36 160 213	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4026422#exec_sum	36 Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis 160 Ionotropic gamma-aminobutyric acid receptor activation mediated neurotransmission inhibition leading to mortality 213 Inhibition of fatty acid beta oxidation leading to nonalcoholic steatohepatitis (NASH)		MIE 231 Decreased, PPAR-alpha activation MIE 232 Decreased, PPAR-beta activation MIE 233 Decreased, PPAR-gamma activation MIE 762 Activation, ionotropic GABA Receptor chloride channel MIE 1490 Inhibition, Fatty Acid Beta Oxidation		KE 327 Accumulation, Fatty acid KE 140 Decreased, HSD17B10 expression KE 179 Decreased, Mitochondrial fatty acid beta-oxidation KE 8 Decreased, 3-hydroxyacyl-CoA dehydrogenase type-2 activity KE 1012 Increased, Inhibitory postsynaptic potential KE 1014 Induction, Somatic muscle paralysis KE 761 Increased, Chloride conductance KE 1015 Increased, Neuronal synaptic inhibition KE 1016 Inhibition, Feeding KE 1305 Increase, cytosolic fatty acid KE 459 Increased, Liver Steatosis KE 1115 Increased, Reactive oxygen species KE 1491 Increased, Oncotic Necrosis	**AO 459 Increased, Liver Steatosis** **AO 351 Increased Mortality** **AO 1489 N/A, Steatohepatisis**				-		
Methanol	67-56-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2021731#exec_sum											
Methyl cellosolve acetate	110-49-6	No AOPs available 12 13	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2025553#exec_sum	12 Chronic binding of antagonist to N-methyl-D-aspartate receptors (NMDARs) during brain development leads to neurodegeneration with impairment in learning and memory in aging 13 Chronic binding of antagonist to N-methyl-D-aspartate receptors (NMDARs) during brain development induces impairment of learning and memory abilities		MIE 201 Binding of antagonist, NMDA receptors MIE 201 Binding of antagonist, NMDA receptors		KE 195 Inhibition, NMDARs KE 52 Decreased, Calcium influx KE 381 Reduced levels of BDNF KE 55 N/A, Cell injury/death KE 188 N/A, Neuroinflammation KE 52 Decreased, Calcium influx KE 195 Inhibition, NMDARs KE 381 Reduced levels of BDNF KE 382 Aberrant, Dendritic morphology KE 385 Decrease of synaptogenesis KE 386 Decrease of neuronal network function KE 383 Reduced, Presynaptic release of glutamate KE 55 N/A, Cell injury/death	**AO 352 N/A, Neurodegeneration N/A, Neurodegeneration** **8 AO 341 Impairment, Learning and memory** **AO 341 Impairment, Learning and memory**				-		
Methyl formate	107-31-3	No AOPs available 12 13	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5025609#exec_sum	12 Chronic binding of antagonist to N-methyl-D-aspartate receptors (NMDARs) during brain development leads to neurodegeneration with impairment in learning and memory in aging 13 Chronic binding of antagonist to N-methyl-D-aspartate receptors (NMDARs) during brain development induces impairment of learning and memory abilities		MIE 201 Binding of antagonist, NMDA receptors MIE 201 Binding of antagonist, NMDA receptors TOX21_HSE_BLA_agonist_ch2		KE 195 Inhibition, NMDARs KE 52 Decreased, Calcium influx KE 381 Reduced levels of BDNF KE 55 N/A, Cell injury/death KE 188 N/A, Neuroinflammation KE 52 Decreased, Calcium influx KE 195 Inhibition, NMDARs KE 381 Reduced levels of BDNF KE 382 Aberrant, Dendritic morphology KE 385 Decrease of synaptogenesis KE 386 Decrease of neuronal network function KE 383 Reduced, Presynaptic release of glutamate KE 55 N/A, Cell injury/death	**AO 352 N/A, Neurodegeneration N/A, Neurodegeneration** **8 AO 341 Impairment, Learning and memory** **AO 341 Impairment, Learning and memory**			sAOP#107-31-3.jpg		
Methyl isobutyl ketone	108-10-1	**AOP Links: 12, 13, 60**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5021889#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis	https://aopwiki.org/aops/60	245 Activation, PXR/SXR	https://aopwiki.org/events/245	471 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36 465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid	**459 Increased, Liver Steatosis**				sAOP#108-10-1.jpg		
Methyl-2-hydroxy isobutyrate	2110-78-3	No AOPs available 12, 13	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5062184#exec_sum	12 Chronic binding of antagonist to N-methyl-D-aspartate receptors (NMDARs) during brain development leads to neurodegeneration with impairment in learning and memory in aging 13 Chronic binding of antagonist to N-methyl-D-aspartate receptors (NMDARs) during brain development induces impairment of learning and memory abilities		MIE 201 Binding of antagonist, NMDA receptors MIE 201 Binding of antagonist, NMDA receptors		KE 195 Inhibition, NMDARs KE 52 Decreased, Calcium influx KE 381 Reduced levels of BDNF KE 55 N/A, Cell injury/death KE 188 N/A, Neuroinflammation KE 52 Decreased, Calcium influx KE 195 Inhibition, NMDARs KE 381 Reduced levels of BDNF KE 382 Aberrant, Dendritic morphology KE 385 Decrease of synaptogenesis KE 386 Decrease of neuronal network function KE 383 Reduced, Presynaptic release of glutamate KE 55 N/A, Cell injury/death	**AO 352 N/A, Neurodegeneration N/A, Neurodegeneration** **8 AO 341 Impairment, Learning and memory** **AO 341 Impairment, Learning and memory**				-		
Methyl-3-methoxy propionate	3852-09-3	**AOP Links: 12, 13, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3052060#exec_sum	Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/200	1181 Activation, Estrogen receptor	https://aopwiki.org/events/1181	1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts 1198 Activation, Macrophages 1213 Increased, Angiogenesis 1239 Altered, Gene Expression 1240 Altered, Protein Production 1241 Increased, Motility 1242 Increased, Second Messenger Production	**1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11d4aop-200.jpg		-		
Methylchloro-isothiazolinone	26172-55-4	**AOP Links: 60, 150, 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9034286#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/60 https://aopwiki.org/aops/150 https://aopwiki.org/aops/187	245 Activation, PXR/SXR 18 Activation, AhR 1134Irreversibleinhibitionofhepatic VKORbybindingofARattyrosine139,FailuretocyclevitaminKepoxidetovitaminKtoformvitaminKhydroquinone 1138Uncouplingofoxidativephosphorylation,Reducedabilitytogenerateatp 1169AnticoagulantrodenticideinterferewithcarboxylationofGlaproteinsinbone,Impairmentofpost-translationalmodification(carboxylation)ofosteocalcin	https://aopwiki.org/events/245 https://aopwiki.org/events/18 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	471Inhibition,FoxA2Inhibition,FoxA2 179Decreased,Mitochondrialfattyacidbeta-oxidation 472DownRegulation,CPT1A 474DownRegulation,HMGCS2 462UpRegulation,SCD-1 54UpRegulation,CD36 465increased,FAinflux 477Decreased,Ketogenesis 454increased,Triglyceridefomation 327Accumulation,Fattyacid 944dimerization,AHR/ARNT 945reduceddimerization,ARNT/HIF1-alpha	**459 Increased, Liver Steatosis** **947 Increase, Early Life Stage Mortality** **1136 Impaired recruitment, Population trajectory**	https://aopwiki.org/system/dragonfly/production/2018/03/28/9bbinwwpy_AOP_150_graphical_representation_March_28_2018.jpg		sAOP#26172-55-4.jpg		
Molybdenum disilicide	12136-78-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6010142#exec_sum										-	
N-(2-Hydroxyethyl)ethylenediamine	111-41-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7027423#exec_sum										sAOP#111-41-1.jpg	
Naphthalene	91-20-3	AOP Links: 60, 124, 200		60	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis	MIE 245 Activation, PXR/SXR		KE 471 Inhibition, FoxA2 KE 179 Decreased, Mitochondrial fatty acid beta-oxidation KE 472 Down Regulation, CPT1A KE 474 Down Regulation, HMGCS2 KE 462 Up Regulation, SCD-1 KE 54 Up Regulation, CD36 KE 465 Increased, FA Influx KE 477 Decreased, Ketogenesis KE 454 Increased, Triglyceride formation KE 327 Accumulation, Fatty acid	AO 459 Increased, Liver Steatosis		-	sAOP#91-20-3.jpg		
Naphthalene				124	HMG-CoA reductase inhibition leading to decreased fertility	MIE 804 Inhibition, HMG-CoA reductase		KE 805 Decreased, mevalonate KE 807 Decreased, cholesterol KE 808 Decreased, Testosterone KE 809 malformed, Male reproductive tract	AO 330 Decrease, Fertility		-	sAOP#91-20-3.jpg		

1naphthalene				200	Estrogen receptor activation leading to breast cancer	MIE 1181 Activation, Estrogen receptor		KE 1182 Increase, Cell Proliferation (Epithelial Cells) KE 1183 Decreased, Apoptosis (Epithelial Cells) KE 177 N/A, Mitochondrial dysfunction 1 KE 1088 Increased, Oxidative Stress KE 1187 Increased, ER binding to DNA (classical pathway) KE 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) KE 1189 Increased, Proliferation (Endothelial cells) KE 1190 Increased, Migration (Endothelial Cells) KE 1191 Increased, Non-genomic signaling KE 1192 Increased, Ductal Hyperplasia KE 1194 Increase, DNA damage KE 1195 modulation, Extracellular Matrix Composition KE 1196 Increased, Invasion KE 1197 Activation, Fibroblasts KE 1198 Activation, Macrophages KE 1213 Increased, Angiogenesis KE 1239 Altered, Gene Expression KE 1240 Altered, Protein Production KE 1241 Increased, Motility KE 1242 Increased, Second Messenger Production	AO 1193 N/A, Breast Cancer		-	sAOPW91-20-3.jpg		
n-Butyl acetate	123-86-4	**AOP Links: 124**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3021982#exec_sum	HMG-CoA reductase inhibition leading to decreased fertility	https://aopwiki.org/aops/124	804 Inhibition, HMG-CoA reductase	https://aopwiki.org/events/804	805 Decreased, mevalonate 807 Decreased, cholesterol 808 Decreased, Testosterone 809 malformed, Male reproductive tract	330 Decrease, Fertility			sAOPW123-86-4.jpg		
n-Butyl alcohol	71-36-3	**AOP Links: 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1021740#exec_sum	Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/200	1181 Activation, Estrogen receptor	https://aopwiki.org/events/1181	1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts 1198 Activation, Macrophages 1213 Increased, Angiogenesis 1239 Altered, Gene Expression 1240 Altered, Protein Production 1241 Increased, Motility 1242 Increased, Second Messenger Production	**1193 N/A, Breast Cancer**			sAOPW71-36-3.jpg		
N-butyl glycidyl ether	2426-08-6	AOP Links: 60		60	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis	MIE 245 Activation, PXR/SXR		KE 471 Inhibition, FoxA2 KE 179 Decreased, Mitochondrial fatty acid beta-oxidation KE 472 Down Regulation, CPT1A KE 474 Down Regulation, HMGCS2 KE 462 Up Regulation, SCD-1 KE 54 Up Regulation, CD36 KE 465 Increased, FA Influx KE 477 Decreased, Ketogenesis KE 454 Increased, Triglyceride formation KE 327 Accumulation, Fatty acid	AO 459 Increased, Liver Steatosis		-	sAOPW2426-08-6.jpg		
n-Hexane	110-54-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0021917#exec_sum								-			
Nickel	7440-02-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2020925#exec_sum								-			
Nickel carbonyl	13463-39-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0024212#exec_sum								-			
Nickel(III) oxide	1313-99-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7025710#exec_sum								-			
Nitric acid	7697-37-2	No AOPs available 213, 160, 36	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5029685#exec_sum	36 Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis 160 Ionotropic gamma-aminobutyric acid receptor activation mediated neurotransmission inhibition leading to mortality 213 Inhibition of fatty acid beta oxidation leading to nonalcoholic steatohepatitis (NASH)		MIE 231 Decreased, PPAR-alpha activation MIE 232 Decreased, PPAR-beta activation MIE 233 Decreased, PPAR-gamma activation MIE 762 Activation, ionotropic GABA Receptor chloride channel MIE 1490 Inhibition, Fatty Acid Beta Oxidation		KE 327 Accumulation, Fatty acid KE 140 Decreased, HSD17B10 expression KE 179 Decreased, Mitochondrial fatty acid beta-oxidation KE 8 Decreased, 3-hydroxyacyl-CoA dehydrogenase type-2 activity KE 1012 Increased, Inhibitory postsynaptic potential KE 1014 Induction, Somatic muscle paralysis KE 761 Increased, Chloride conductance KE 1015 Increased, Neuronal synaptic inhibition KE 1016 Inhibition, Feeding KE 1305 Increase, cytosolic fatty acid KE 459 Increased, Liver Steatosis KE 1115 Increased, Reactive oxygen species KE 1491 Increased, Oncotic Necrosis	**AO 459 Increased, Liver Steatosis** **AO 351 Increased Mortality** **AO 1489 N/A, Steatohepatisis**	296 Oxidative DNA damage leading to chromosomal aberrations and mutations MIE 1634 Increase, Oxidative damage to DNA KE 155 N/A, Inadequate DNA repair KE 1635 Increase, DNA strand breaks AO 185 Increase, Mutations AO 1636 Increase, Chromosomal aberrations Increase, Chromosomal aberrations	84년생, 여성 (백혈병)	-	- 삼성전자(천안), LCD - 식각, BM, RGB, 검사, UV Asher, C/S /오퍼레이터	- 벤젠, 포름알데히드, 과산화수소, 불산, 황산, 질산, THAH, PGMEA 등 - 전리방사선, 비전리방사선
Nitric oxide (Nitrogen monoxide)	10102-43-9	No AOPs available 294	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1020938#exec_sum	294 Increased reactive oxygen and nitrogen species (RONS) leading to increased risk of breast cancer		MIE 1632 Increase in reactive oxygen and nitrogen species (RONS)		KE 1182 Increase, Cell Proliferation (Epithelial Cells) KE 1492 Tissue resident cell activation KE 1493 Increased Pro-inflammatory mediators KE 1494 Leukocyte recruitment/activation	**AO 1194 Increase, DNA damage** **AO 185 Increase, Mutations** **AO 1192 Increased, Ductal Hyperplasia** **AO 1193 N/A, Breast Cancer**			-		
NITRIDES	18851-77-9	No AOPs available	-									-		
Nitrilotriacetic acid	139-13-9	**AOP Links: 187, 200**		187	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	MIE 1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone MIE 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP MIE 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin		KE 1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis KE 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) KE 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) KE 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal KE 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors KE 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction KE 1151 Osteoporosis and vascular calcification, Bone deterioration	AO 1136 Impaired recruitment , Population trajectory		-	sAOPW139-13-9.jpg		

Nitrilotriacetic acid				200	Estrogen receptor activation leading to breast cancer	MIE 1181 Activation, Estrogen receptor		KE 1182 Increase, Cell Proliferation (Epithelial Cells) KE 1183 Decreased, Apoptosis (Epithelial Cells) KE 177 N/A, Mitochondrial dysfunction 1 KE 1088 Increased, Oxidative Stress KE 1187 Increased, ER binding to DNA (classical pathway) KE 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) KE 1189 Increased, Proliferation (Endothelial cells) KE 1190 Increased, Migration (Endothelial Cells) KE 1191 Increased, Non-genomic signaling KE 1192 Increased, Ductal Hyperplasia KE 1194 Increase, DNA damage KE 1195 modulation, Extracellular Matrix Composition KE 1196 Increased, Invasion KE 1197 Activation, Fibroblasts KE 1198 Activation, Macrophages KE 1213 Increased, Angiogenesis KE 1239 Altered, Gene Expression KE 1240 Altered, Protein Production KE 1241 Increased, Motility KE 1242 Increased, Second Messenger Production	AO 1193 N/A, Breast Cancer		-	sAOP₩139-13-9.jpg		
Nitrobenzene	98-95-3	**AOP Links: 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3020964#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin 1181 Activation, Estrogen receptor	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts	**1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP₩98-95-3.jpg		
Nitrogen trifluoride	7783-54-2	No AOPs available 294	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4040181#exec_sum	294 Increased reactive oxygen and nitrogen species (RONS) leading to increased risk of breast cancer		MIE 1632 Increase in reactive oxygen and nitrogen species (RONS)		KE 1182 Increase, Cell Proliferation (Epithelial Cells) KE 1492 Tissue resident cell activation KE 1493 Increased Pro-inflammatory mediators KE 1494 Leukocyte recruitment/activation	**AO 1194 Increase, DNA damage** **AO 185 Increase, Mutations** **AO 1192 Increased, Ductal Hyperplasia** **AO 1193 N/A, Breast Cancer**			-		
Nitrous oxide	10024-97-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8021066#exec_sum									-		
N-Methyl-2-pyrrolidone	872-50-4	**AOP Links: 12, 13, 153**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6020856#exec_sum	Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats	https://aopwiki.org/aops/153	964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol	https://aopwiki.org/events/964	965 reduction in ovarian granulosa cells synthesis of estradiol, Reduced steroidogenic production of estradiol in granulosa cells 966 Reduced Estradiol in Circulation, Reduced steroidogenic production of estradiol in granulosa cells leading to decreased estradiol in circulation 967 Decreased positive estrogenic feedback on hypothalamus, Reduced estradiol in circulation decreases estrogen concentration at hypothalamus 968 Decreased Kisspeptin release from neurons in AVPV, Decreased hypothalamic estrogen reduces kisspeptinergic neuron response 969 Decreased GnRH Release, Decreased Kisspeptin stimulation of GnRH neurons 970 Decreased LH release from Anterior Pituitary, Decreased GnRH stimulation of Anterior Pituitary Gonadotrophs 971 Ovulation of oocytes Reduced, Delayed, or Blocked, Decrease or delay in LH surge required for ovulation	**972 Decreased fertility, Reduced number of oocytes ovulated**			sAOP₩872-50-4.jpg		
Octafluoro cyclobutane	115-25-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9041811#exec_sum									-		
Octafluoro cyclopentene	559-40-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7073193#exec_sum									-		
Octafluoro propane	76-19-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9052503#exec_sum									-		
Octamethyltrisiloxane	107-51-7	**AOP Links: 60**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9040710#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis	https://aopwiki.org/aops/60	245 Activation, PXR/SXR	https://aopwiki.org/events/245	471 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36 465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid	**459 Increased, Liver Steatosis**			sAOP₩107-51-7.jpg		
Ozone	10028-15-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0021098#exec_sum									-		
Pentaborane	19624-22-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID10880057#exec_sum									-		
Pentaerythritol triacrylate	3524-68-3	**AOP Links: 36, 43, 58, 59, 60, 61, 66, 107, 150, 153, 163, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2025842#exec_sum	Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis Disruption of VEGFR Signaling Leading to Developmental Defects NR1I3 (CAR) suppression leading to hepatic steatosis HNF4alpha suppression leading to hepatic steatosis NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis NFE2L2/FXR activation leading to hepatic steatosis Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats PPARgamma activation leading to sarcomas in rats, mice, and hamsters Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/36 https://aopwiki.org/aops/43 https://aopwiki.org/aops/58 https://aopwiki.org/aops/59 https://aopwiki.org/aops/60 https://aopwiki.org/aops/61 https://aopwiki.org/aops/66 https://aopwiki.org/aops/107 https://aopwiki.org/aops/150 https://aopwiki.org/aops/153 https://aopwiki.org/aops/163 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	231Decreased,PPAR-alphaactivation 232Decreased,PPAR-betaactivation 233Decreased,PPAR-gammaactivation 305 Inhibition, VegfR2 456Suppression,Constitutiveandrostanereceptor,NR1I3 468Inhibition,PPARalpha 167Activation,LXR 228peroxisomeproliferatoractivatedreceptorpromoterdemethylation 461 Suppression, HNF4alpha 245 Activation, PXR/SXR 478Activation,NRF2 479Activation,NR1H4 653DecreasedtestosteronebythefetalLeydigcells,Increasedcorticosterone 654DecreasedtestosteronebythefetalLeydigcells,Activationbyotherglucocorticoidreceptoragonists 715 Activation, Constitutive androstane receptor 18 Activation, AhR 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol 1028 Activation of specific nuclear receptors, PPAR-gamma activation 1134IrreversibleinhibitionofhepaticVKORbybindingofARattyrosine139,FailuretocyclevitaminKepoxidetovitaminKtoformvitaminKhydroquin	https://aopwiki.org/events/231 https://aopwiki.org/events/232 https://aopwiki.org/events/233 https://aopwiki.org/events/305 https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/461 https://aopwiki.org/events/245 https://aopwiki.org/events/478 https://aopwiki.org/events/479 https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/715 https://aopwiki.org/events/18 https://aopwiki.org/events/964 https://aopwiki.org/events/1028 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	327Accumulation,FattyacidAccumulation,Fattyacid 140Decreased,HSD17B10expressionDecreased,HSD17B10expression 179Decreased,Mitochondrialfattyacidbeta-oxidationDecreased,Mitochondrialfattyacidbeta-oxidation 8Decreased,3-hydroxyacyl-CoAdehydrogenasetype-2activity 28Reduction,Angiogenesis 110Impairment,Endothelialnetwork 298Insufficiency,Vascular 457Activation,SREBF1 66Activation,ChREBP 458Increased,DeNovoFAsynthesis 454Increased,Triglycerideformation 54UpRegulation,CD36 462UpRegulation,SCD-1 463UpRegulation,FAS 451Inhibition,Mitochondrialfattyacidbeta-oxidation 327Accumulation,Fattyacid 470UpRegulation,Acetyl-CoAcarboxylase-1(ACC-1) 465Increased,FAInflux 471Inhibition,FoxA2Inhibition,FoxA2 179Decreased,Mitochondrialfattyacidbeta-oxidation 472DownRegulation,CPT1A 474DownRegulation,HMGCS2 462UpRegulation,SCD-1	**459 Increased, Liver Steatosis** **1001 Increased, Developmental Defects** **459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **505 Decreased sperm quantity / quality in the adult, Decreased fertility** **719 Increase, Adenomas/carcinomas (hepatocellular)** **947 Increase, Early Life Stage Mortality** **972 Decreased fertility, Reduced number of oocytes ovulated** **1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/30/5569z0kizt_KleinstreuerKnudsenAOPVascularDisruption.jpg https://aopwiki.org/system/dragonfly/production/2018/05/31/1n1zo2kaml_Graphic_CAR_AOP_revised_May2018pptx.jpg https://aopwiki.org/system/dragonfly/production/2018/03/28/9btjinwwpy_AOP_150_graphical_representation_March_28_2018.jpg https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		-		
Perfluoro compounds, C5-18	86508-42-1	https://aopwiki.org/stressors?utf8=%E2%9C%93&search=Perfluoro&commit=Search&find_by_id=	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5029059#exec_sum	AOP 37 PPARalpha-dependent liver cancer		MIE 227 Activation, PPARα		KE 1170 modulation, Genes/proteins that regulate hepatocyte fate KE 716 Increase, Mitogenic cell proliferation (hepatocytes) KE 1171 Increase, Clonal Expansion / Cell Proliferatin to form Pre-Neoplastic Altered Hepatic Foci	**AO 719 Increase, Adenomas/carcinomas (hepatocellular)**			-		
Perfluoroisobutylene	382-21-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4073176#exec_sum									-		

Perfluorooctane sulfonic acid	1763-23-1	**AOP Links: 36, 43, 58, 60, 66, 103, 107, 153, 160, 163, 187, 200, 213**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3031864#exec_sum	Disruption of VEGFR Signaling Leading to Developmental Defects NR1I3 (CAR) suppression leading to hepatic steatosis NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Cyclooxygenase inhibition leading to reproductive dysfunction via interference with spindle assembly checkpoint Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/43 https://aopwiki.org/aops/58 https://aopwiki.org/aops/60 https://aopwiki.org/aops/66 https://aopwiki.org/aops/103 https://aopwiki.org/aops/107 https://aopwiki.org/aops/153 https://aopwiki.org/aops/154 https://aopwiki.org/aops/155 https://aopwiki.org/aops/200	305 Inhibition, VegfR2 456Suppression,Constitutiveandrostanereceptor,NR1I3 468Inhibition,PPARalpha 167Activation,LXR 228peroxisomeproliferatoractivatedreceptorpromoterdemethylation 245 Activation, PXR/SXR 653DecreasedtestosteronebythefetalLeydigcells,Increasedcorticosterone 654DecreasedtestosteronebythefetalLeydigcells,Activationbyotherglucocorticoidreceptoragonists 79 Inhibition, Cyclooxygenase activity 715 Activation, Constitutive androstane receptor 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol 965 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol 966 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol 1181 Activation, Estrogen receptor	https://aopwiki.org/events/305 https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/245 https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/79 https://aopwiki.org/events/715 https://aopwiki.org/events/964 https://aopwiki.org/events/965 https://aopwiki.org/events/966 https://aopwiki.org/events/1181	28Reduction,Angiogenesis 110Impairment,Endothelialnetwork 298Insufficiency,Vascular 457Activation,SREBF1 66Activation,ChREBP 458Increased,DeNovoFAsynthesis 454Increased,Triglycerideformation 54UpRegulation,CD36 462UpRegulation,SCD-1 463UpRegulation,FAS 451Inhibition,Mitochondrialfattyacidbeta-oxidation 327Accumulation,Fattyacid 470UpRegulation,Acetyl-CoAcarboxylase-1(ACC-1) 465Increased,FAInflux 471Inhibition,FoxA2Inhibition,FoxA2 179Decreased,Mitochondrialfattyacidbeta-oxidation 472DownRegulation,CPT1A 474DownRegulation,HMGCS2 462UpRegulation,SCD-1 54UpRegulation,CD36 465Increased,FAInflux 477Decreased,Ketogenesis 454Increased,Triglycerideformation 327Accumulation,Fattyacid 655DecreasedtestosteronebythefetalLeydigcells,IncreasedCOUP-TFIIinfetalLeydigcells	**1001 Increased, Developmental Defects** **459 Increased, Liver Steatosis** **459 Increased, Liver Steatosis** **505 Decreased sperm quantity / quality in the adult, Decreased fertility** **675Reduced,ReproductiveSuccessReduced,ReproductiveSuccess** **360Decrease,Populationtrajectory** **719 Increase, Adenomas/carcinomas (hepatocellular)** **972 Decreased fertility, Reduced number of oocytes ovulated** **973 Decreased fertility, Reduced number of oocytes ovulated** **974 Decreased fertility, Reduced number of oocytes ovulated** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/30/5569z0kizt_KleinstreuerKnudsenAOPVascularDisruption.jpg https://aopwiki.org/system/dragonfly/production/2018/05/31/1n1zo2kaml_Graphic_CAR_AOP_revised_May2018pptx.jpg https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP₩1763-23-1.jpg		
Perfluorotributylamine	311-89-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0027141#exec_sum									-		
Perylene	198-55-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4047753#exec_sum									-		
Phenol	108-95-2	**AOP Links: 58, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5021124#exec_sum	NR1I3 (CAR) suppression leading to hepatic steatosis Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/58 https://aopwiki.org/aops/200	456 Suppression, Constitutive androstane receptor, NR1I3 468 Inhibition, PPAR alpha 167 Activation, LXR 228 peroxisome proliferator activated receptor promoter demethylation 1181 Activation, Estrogen receptor	https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/1181	457 Activation, SREBF1 66 Activation, ChREBP 458 Increased, De Novo FA synthesis 454 Increased, Triglyceride formation 54 Up Regulation, CD36 462 Up Regulation, SCD-1 463 Up Regulation, FAS 451 Inhibition, Mitochondrial fatty acid beta-oxidation 327 Accumulation, Fatty acid 470 Up Regulation, Acetyl-CoA carboxylase-1 (ACC-1) 465 Increased, FA Influx 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage	**459 Increased, Liver Steatosis** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg	76년생, 여성 (난소암, 사망)	sAOP₩108-95-2.jpg	- 삼성전자(온양)_반도체 - 와이어본딩/오퍼레이터 - 1993.4/1999.6	- 2012.4/2013.2 - 2013.5/2017.7
Phenol, 4,4'-(1-methylethylidene)bis-, polymer with 2-(chloromethyl)oxirane	25068-38-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0050479#exec_sum									-		
Phenol-formaldehyde resin	9003-35-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2049713#exec_sum									-		
Phosphine	7803-51-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2021157#exec_sum								85년생, 여성 (백혈병, 사망)	-	- 삼성전자(기흥) 반도체 - 확산,식각/오퍼레이터 - 2003.1/2005.6	- 2007.6/2009.11 - 2010.1/2014.8
Phosphoric acid	7664-38-2	**AOP Links: 36, 160, 187, 213**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5024263#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/187	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction	**1136 Impaired recruitment, Population trajectory**		78년생, 남성 재생불량성빈혈, 사망)	sAOP₩7664-38-2.jpg	- 삼성전자(화성)_반도체 - 클린/엔지니어	- 불산, 황산, 질산, 과산화수소, 인산, 아세트산, IPA, 카테콜 등
Phosphorus	7723-14-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1024382#exec_sum									-		
Phosphorus (yellow)	12185-10-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID90923991#exec_sum									-		
Phosphorus oxychloride	10025-87-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5029710#exec_sum									sAOP₩10025-87-3.jpg		
Phosphorus pentafluoride	7647-19-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9064760#exec_sum									-		
Phosphorus pentoxide	1314-56-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9047754#exec_sum									-		
Phosphorus tribromide	7789-60-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7064869#exec_sum									-		
Phosphorus trichloride	7719-12-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5029687#exec_sum									-		

Piperazine	110-85-0	**AOP Links: 107, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchId=TXSID1021164#exec_sum	Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/107 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	715 Activation, Constitutive androstane receptor 1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin 1181 Activation, Estrogen receptor	https://aopwiki.org/events/715 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	1214 Altered gene expression specific to CAR activation, Hepatocytes 716 Increase, Mitogenic cell proliferation (hepatocytes) 774 Increase, Preneoplastic foci (hepatocytes) 1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration 1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition	**719 Increase, Adenomas/carcinomas (hepatocellular)** **1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2018/05/31/1n1xo2kaml_Graphic_CAR_AOP_revised_May2018pptxjpg https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#110-85-0.jpg		
Platinum, soluble salts	7440-06-4	No AOPs available 27	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchId=TXSID9064681#exec_sum	27 Cholestatic Liver Injury induced by Inhibition of the Bile Salt Export Pump (ABCB11)		MIE 41 Inhibition, Bile Salt Export Pump (ABCB11)		KE 288 Activation of specific nuclear receptors, Transcriptional change KE 214 Bile accumulation, Pathological condition KE 87 Release, Cytokine KE 149 Increase, Inflammation KE 249 Production, Reactive oxygen species KE 209 Peptide Oxidation	**AO 357 Cholestasis, Pathology**			-		
Polyethylene glycol	25322-68-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchId=TXSID4027862#exec_sum									-		
Polyethylene polypropylene glycol	9003-11-6	**AOP Links: 60, 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchId=TXSID4047597#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/60 https://aopwiki.org/aops/187	245 Activation, PXR/SXR 1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin	https://aopwiki.org/events/245 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	471 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36 465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid 1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration	**459 Increased, Liver Steatosis** **1136 Impaired recruitment, Population trajectory**			sAOP#9003-11-6.jpg		
Potassium dichromate	7778-50-9	**AOP Links: 36, 61, 66, 107, 153, 163, 187, 200**		36	Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis	MIE 231 Decreased, PPAR-alpha activation MIE 232 Decreased, PPAR-beta activation MIE 233 Decreased, PPAR-gamma activation		KE 327 Accumulation, Fatty acid KE 140 Decreased, HSD17B10 expression KE 179 Decreased, Mitochondrial fatty acid beta-oxidation KE 8 Decreased, 3-hydroxyacyl-CoA dehydrogenase type-2 activity	AO 459 Increased, Liver Steatosis		-	sAOP#7778-50-9.jpg		
Potassium dichromate				61	NFE2L2/FXR activation leading to hepatic steatosis	MIE 478 Activation, NRF2 MIE 479 Activation, NR1H4		KE 480 Activation, SHP KE 227 Activation, PPARα KE 482 Decreased, DHB4/HSD17B4 KE 451 Inhibition, Mitochondrial fatty acid beta-oxidation KE 483 Activation, LXR alpha KE 878 Inhibition, SREBP1c KE 879 Activation, MTTP KE 880 Increased, Apob100 KE 881 Increased, Triglyceride KE 458 Increased, De Novo FA synthesis	AO 459 Increased, Liver Steatosis		-	sAOP#7778-50-9.jpg		
Potassium dichromate				66	Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis	MIE 653 Decreased testosterone by the fetal Leydig cells, Increased corticosterone MIE 654 Decreased testosterone by the fetal Leydig cells, Activation by other glucocorticoid receptor agonists		KE 655 Decreased testosterone by the fetal Leydig cells, Increased COUP-TFII in fetal Leydig cells KE 656 Decreased number and function of adult Leydig cells, Decreased COUP-TFII stem Leydig cells KE 657 Decreased testosterone by the fetal Leydig cells, Dysgenesis of fetal Leydig cells	AO 505 Decreased sperm quantity / quality in the adult, Decreased fertility		-	sAOP#7778-50-9.jpg		
Potassium dichromate				107	Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat	MIE 715 Activation, Constitutive androstane receptor		KE 1214 Altered gene expression specific to CAR activation, Hepatocytes KE 716 Increase, Mitogenic cell proliferation (hepatocytes) KE 774 Increase, Preneoplastic foci (hepatocytes)	AO 719 Increase, Adenomas/carcinomas (hepatocellular)		-	sAOP#7778-50-9.jpg		
Potassium dichromate				153	Aromatase Inhibition leading to Ovulation Inhibition and Decreased Fertility in Female Rats	MIE 964 Inhibition of Aromatase Enzyme, Chemical exposure during critical window of estrous cycle between diestrus 2 and proestrus inhibits aromatase conversion of testosterone to estradiol		KE 965 reduction in ovarian granulosa cells synthesis of estradiol, Reduced steroidogenic production of estradiol in granulosa cells KE 966 Reduced Estradiol in Circulation, Reduced steroidogenic production of estradiol in granulosa cells leading to decreased estradiol in circulation KE 967 Decreased positive estrogenic feedback on hypothalamus, Reduced estradiol in circulation decreases estrogen concentration at hypothalamus KE 968 Decreased Kisspeptin release from neurons in AVPV, Decreased hypothalamic estrogen reduces kisspeptinergic neuron response KE 969 Decreased GnRH Release, Decreased Kisspeptin stimulation of GnRH neurons KE 970 Decreased LH release from Anterior Pituitary, Decreased GnRH stimulation of Anterior Pituitary Gonadotrophs KE 971 Ovulation of oocytes Reduced, Delayed, or Blocked, Decrease or delay in LH surge required for ovulation	AO 972 Decreased fertility, Reduced number of oocytes ovulated		-	sAOP#7778-50-9.jpg		
Potassium dichromate				163	PPARgamma activation leading to sarcomas in rats, mice, and hamsters	MIE 1028 Activation of specific nuclear receptors, PPAR-gamma activation		KE 1029 Increased, adipogenesis KE 1032 Increased, secretion of local growth factors KE 1033 Increased, proliferation of mesenchymal cells KE 1034 Increased, IGF-1 (mouse) KE 1035 Increased, Firbrosarcoma KE 1036 Increased, liposarcoma KE 1037 Increased, hemagiosarcoma	-		-	sAOP#7778-50-9.jpg		
Potassium dichromate				187	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	MIE 1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone MIE 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP MIE 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin		KE 1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis KE 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) KE 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) KE 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal KE 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors KE 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction KE 1151 Osteoporosis and vascular calcification, Bone deterioration	AO 1136 Impaired recruitment , Population trajectory		-	sAOP#7778-50-9.jpg		
Potassium dichromate				200	Estrogen receptor activation leading to breast cancer	MIE 1181 Activation, Estrogen receptor		KE 1182 Increase, Cell Proliferation (Epithelial Cells) KE 1183 Decreased, Apoptosis (Epithelial Cells) KE 177 N/A, Mitochondrial dysfunction 1 KE 1088 Increased, Oxidative Stress KE 1187 Increased, ER binding to DNA (classical pathway) KE 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) KE 1189 Increased, Proliferation (Endothelial cells) KE 1190 Increased, Migration (Endothelial Cells) KE 1191 Increased, Non-genomic signaling KE 1192 Increased, Ductal Hyperplasia KE 1194 Increase, DNA damage KE 1195 modulation, Extracellular Matrix Composition KE 1196 Increased, Invasion KE 1197 Activation, Fibroblasts KE 1198 Activation, Macrophages KE 1213 Increased, Angiogenesis KE 1239 Altered, Gene Expression KE 1240 Altered, Protein Production KE 1241 Increased, Motility KE 1242 Increased, Second Messenger Production	AO 1193 N/A, Breast Cancer		-	sAOP#7778-50-9.jpg		
Potassium hydroxide	1310-58-3	No AOPs available 95	https://comptox.epa.gov/dashboard/dsstoxdb/results?searchId=TXSID5029633#exec_sum	95 Ether-a-go-go (ERG) voltage-gated potassium channel inhibition leading to reduced survival		MIE 593 Inhibition, Ether-a-go-go (ERG) voltage-gated potassium channel		KE 585 Decreased, Sodium conductance 1 KE 586 Reduced, swimming speed KE 587 Reduced, feeding 1 KE 588 Increased, predation	**AO 592 Reduced, survival**			-		

Propargyl alcohol	107-19-7	**AOP Links: 177**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5021884#exec_sum	Cyclooxygenase 1 (COX1) inhibition leading to renal failure and mortality	https://aopwiki.org/aops/177	1103 Inhibition, Cyclooxygenase 1 activity	https://aopwiki.org/events/1103	1104 Decreased, Prostaglandin F2alpha concentration, plasma 1105 Occurrence, renal ischemia 1097 Occurrence, renal proximal tubular necrosis 1098 Increased, blood potassium concentration 1106 Occurrence, cardiac arrhythmia 1088 Increased, Oxidative Stress 1096 Increased, blood uric acid concentration 1102 Occurrence, tophi (urate) deposition	351 Increased Mortality 361 Decline, Population			-			
Propyl 3,4,5-tri[(1R-diam-1,6-dihydro-5-oxo-1-naphthyl)sulphonyloxy]benzoate	23003-79-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7072709#exec_sum									-	Carcinogenicity	
Propylene	115-07-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5021205#exec_sum									-		
Propylene glycol dimethylether	111109-77-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0042327#exec_sum									-		
p-tert-Butylphenol formaldehyde resin	25085-50-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7047805#exec_sum									-		
Pyrene	129-00-0	**AOP Links: 60, 66, 107, 150, 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3024289#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis Constitutive androstane receptor activation leading to hepatocellular adenomas and carcinomas in the mouse and the rat Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/60 https://aopwiki.org/aops/66 https://aopwiki.org/aops/107 https://aopwiki.org/aops/150 https://aopwiki.org/aops/187	245 Activation, PXR/SXR 653Decreasedtestosteronebythefetal Leydigcells,Increasedcorticosterone 654Decreasedtestosteronebythefetal Leydigcells,Activationbyothergluccorticoidreceptoragonists 715 Activation, Constitutive androstane receptor 18 Activation, AhR 1134Irreversibleinhibitionofhepatic VKORbybindingofARattyrosine139,Failuretocyclevitamin Kepoxidetovitamin Kto formvitamin Khydroquinone 1138Uncouplingofoxidativephosphorylation,Reducedabilitytogenerate ATP 1169Anticoagulantrodenticideinterfereswithcarboxylation of Glaproteinsinbone,Impairmentofpost-translationalmodification(carboxylation)ofosteocalcin	https://aopwiki.org/events/245 https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/715 https://aopwiki.org/events/18 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	471Inhibition,FoxA2Inhibition,FoxA2 179Decreased,Mitochondrialfattyacidbeta-oxidation 472DownRegulation,CPT1A 474DownRegulation,HMGCS2 462UpRegulation,SCD-1 54UpRegulation,CD36 465Increased,FAInflux 477Decreased,Ketogenesis 454increased,Triglycerideformation 327Accumulation,Fattyacid 655Decreasedtestosteronebythefetal Leydigcells,IncreasedCOUP-TFIinfetal Leydigcells 656Decreasednumberandfunctionofadult Leydigcells,DecreasedCOUP-TFIIstem Leydigcells 657Decreasedtestosteronebythefetal Leydigcells,DysgenesisoffetalLeydigcells 1214Alteredgeneexpressionspecific to CARactivation,Hepatocytes 716increase,Mitogenic cell proliferation(hepatocytes) 774increase,Preneoplastic foci(hepatocytes) 944dimerization,AHR/ARNT 945reduced dimerization,ARNT/HIF1-alpha 948reduced production,VEGF 110impairment,Endothelial network 317Altered,Cardiovascular development/function 1122Undercarboxylated clotting factors will not assemble on cell surfaces to form clot,Failure of secondary hemostasis 1130Failure in vascular repair mechanisms,Unresolved blood loss(hemorrhage) 1131Failure in gamma-	**459 Increased, Liver Steatosis** **505 Decreased sperm quantity / quality in the adult, Decreased fertility** **719 Increase, Adenomas/carcinomas (hepatocellular)** **947 Increase, Early Life Stage Mortality** **1136 Impaired recruitment, Population trajectory**	https://aopwiki.org/system/dragonfly/production/2018/05/31/1n1pp2kaml.Graphic_CAR_AOP_revised_May2018pptx.png https://aopwiki.org/system/dragonfly/production/2018/03/28/9bt6inwwpy.AOP_150_graphical_representation_March_28_2018.jpg		sAOP#129-00-0.jpg	Mutagenicity
Rhenium	7440-15-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9064685#exec_sum									-		
Rubidium	7440-17-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4064686#exec_sum									-		
Scandium	7440-20-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9064689#exec_sum									-		
Scandium nitride	25764-12-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9067142#exec_sum									-		
Selenium hexafluoride	7783-79-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0099904 1#exec_sum									-		
Selenourea	630-10-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4024303#exec_sum									-		
Silane	7803-62-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6052534#exec_sum									-		
Silica, amorphous	7631-86-9 112926-00-8	**AOP Links: 187**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1029677#exec_sum	Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage	https://aopwiki.org/aops/187	1134 Irreversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin	https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169	1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) 1132 Blood loss and development of anemia, Impaired oxygen delivery and nutrient delivery to tissue, impaired carbon dioxide and waste product removal 1133 Hemostasis, Depletion from blood of fully functional carboxylated clotting factors 1135 Reduced fitness or even mortality, Acidosis, hypovolemic shock and organ dysfunction 1151 Osteoporosis and vascular calcification, Bone deterioration	**1136 Impaired recruitment, Population trajectory**			sAOP#7631-86-9.jpg		
Silicon	7440-21-3 12597-37-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0051444#exec_sum									-		
Silicon nitride	12033-60-2 12033-89-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5089318 1#exec_sum https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2089224 7#exec_sum									-		
Silicon tetrachloride	10026-04-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0029711#exec_sum									-		
Silver	7440-22-4	https://aopwiki.org/stressors?utf8=%E2%9C%93&search=Silver&commit=Search&find_by_id=	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4024305#exec_sum	AOP 27 NADPH oxidase and P38 MAPK activation leading to reproductive failure in Caenorhabditis elegans		MIE 1174 Activation, NADPH Oxidase		KE 1278 ROS formation KE 1279 Increase, Oxidative Stress / Activation, PMK-1 P38 MAPK KE 1280 Activation, HIF-1 KE 1281 Increased, DNA Damage-Repair KE 176 Damaging, Mitochondria KE 1262 Apoptosis	**AO 1277 Reproductive failure**			-		

Sodium hydroxide	1310-73-2	No AOPs available 91, 93, 94, 96, 134, 176, 197	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0029634#exec_sum	91 Sodium channel inhibition leading to reduced survival 93 sodium channel inhibition leading to increased predation 94 Sodium channel inhibition leading to congenital malformations 96 Axonal sodium channel modulation leading to acute mortality 134 Sodium Iodide Symporter (NIS) Inhibition and Subsequent Adverse Neurodevelopmental Outcomes in Mammals 176 Sodium Iodide Symporter (NIS) Inhibition leading to altered amphibian metamorphosis 197 Sodium channel (Nav1.1) inhibition leading to population decline		MIE 584 Inhibition, sodium channel MIE 598 modulation, sodium channel MIE 424 Inhibition, Na+/I- symporter (NIS)		KE 585 Decreased, Sodium conductance 1 KE 586 Reduced, swimming speed KE 444 Increased, Atrioventricular block and bradycardia KE 445 Respiratory distress/arrest KE 590 N/A, hypoxia KE 585 Decreased, Sodium conductance 1 KE 599 prolonged, Depolarization of neuronal membrane KE 600 Overactivation, Neuronotransmitter release KE 601 Overactivation, muscle contraction KE 602 Increased, Ataxia, paralysis, or hyperactivity KE 277 Thyroid hormone synthesis, Decreased KE 425 Decrease of Thyroidal iodide KE 281 Thyroxine (T4) in serum, Decreased KE 280 Thyroxine (T4) in neuronal tissue, Decreased KE 756 Hippocampal gene expression, Altered KE 757 Hippocampal anatomy, Altered KE 758 Hippocampal Physiology, Altered KE 426 Decreased, Thyroxine (T4) in serum KE 1093 Decreased, Thyroxine (T4) in tissues KE 1116 Decreased, Triiodothyronine (T3) in tissues KE 1176 Decreased, sodium conductance 2	**AO 587 Reduced, feeding 1** **AO 588 Increased, predation** **AO 592 Reduced, survival** **AO 591 Increased, amputations** **AO 351 Increased Mortality** **AO 402 Cognitive Function, Decreased** **AO 1101 Altered, Amphibian metamorphosis**			-			
Sodium tetraborate	1303-96-4	No AOPs available									-	-			
Sobine	2809-52-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6010143#exec_sum									-			
Stoddard solvent	8052-41-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9026051#exec_sum								55년생, 여성 (유방암)	-	- QTS(용안),반도체 - 리놀륨,리페어,스태킹/오피레이터 - 2006.9/2011.11	- 2012.10/2014.9 - 2015.6/2017.8
Strontium titanate	12060-59-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7089368#exec_sum											
Sulfolane	126-33-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3027037#exec_sum										aAOP#126-33-0.jpg	
Sulfur hexafluoride	2551-62-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8029656#exec_sum									-		
Sulfuric acid	7664-93-9	No AOPs available 36, 160, 213	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5029683#exec_sum	36 Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis 160 Ionotropic gamma-aminobutyric acid receptor activation mediated neurotransmission inhibition leading to mortality 213 Inhibition of fatty acid beta oxidation leading to nonalcoholic steatohepatitis (NASH)		MIE 231 Decreased, PPAR-alpha activation MIE 232 Decreased, PPAR-beta activation MIE 233 Decreased, PPAR-gamma activation MIE 762 Activation, ionotropic GABA Receptor chloride channel MIE 1490 Inhibition, Fatty Acid Beta Oxidation		KE 327 Accumulation, Fatty acid KE 140 Decreased, HSD17B10 expression KE 179 Decreased, Mitochondrial fatty acid beta-oxidation KE 8 Decreased, 3-hydroxyacyl-CoA dehydrogenase type-2 activity KE 1012 Increased, Inhibitory postsynaptic potential KE 1014 Induction, Somatic muscle paralysis KE 761 Increased, Chloride conductance KE 1015 Increased, Neuronal synaptic inhibition KE 1016 Inhibition, Feeding KE 1305 Increase, cytosolic fatty acid KE 459 Increased, Liver Steatosis KE 1115 Increased, Reactive oxygen species KE 1491 Increased, Oncotic Necrosis	**AO 459 Increased, Liver Steatosis** **AO 351 Increased Mortality** **AO 1489 N/A, Steatohepatisis**	296 Oxidative DNA damage leading to chromosomal aberrations and mutations MIE 1634 Increase, Oxidative damage to DNA KE 155 N/A, Inadequate DNA repair KE 1635 Increase, DNA strand breaks AO 185 Increase, Mutations AO 1636 Increase, Chromosomal aberrations Increase, Chromosomal aberrations	80년생, 여성 (백혈병, 사망)	-	- 상성전자(기흥),반도체 - 식각/오피레이터	- 벤젠, 불산, 황산, IPA, 아르신, 포스핀, 과산화수소, 암모니아, 포름알데하드 등 - 전리 방사선
Tellurium	13494-80-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9032119#exec_sum									-		
tert-Butylarsine	4262-43-5	No AOPs available	-									-		
Tetrachloroethylene	127-18-4	**AOP Links: 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2021319#exec_sum	Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/200	1181 Activation, Estrogen receptor	https://aopwiki.org/events/1181	1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts 1198 Activation, Macrophages 1213 Increased, Angiogenesis 1239 Altered, Gene Expression 1240 Altered, Protein Production 1241 Increased, Motility 1242 Increased, Second Messenger Production	**1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		aAOP#127-18-4.jpg		
Tetraethyl orthosilicate	78-10-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6026450#exec_sum										aAOP#78-10-4.jpg	
Tetrafluoroboric acid	14874-70-5	No AOPs available 36, 160, 213,	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4041773#exec_sum	36 Peroxisomal Fatty Acid Beta-Oxidation Inhibition Leading to Steatosis 160 Ionotropic gamma-aminobutyric acid receptor activation mediated neurotransmission inhibition leading to mortality 213 Inhibition of fatty acid beta oxidation leading to nonalcoholic steatohepatitis (NASH)		MIE 231 Decreased, PPAR-alpha activation MIE 232 Decreased, PPAR-beta activation MIE 233 Decreased, PPAR-gamma activation MIE 762 Activation, ionotropic GABA Receptor chloride channel MIE 1490 Inhibition, Fatty Acid Beta Oxidation		KE 327 Accumulation, Fatty acid KE 140 Decreased, HSD17B10 expression KE 179 Decreased, Mitochondrial fatty acid beta-oxidation KE 8 Decreased, 3-hydroxyacyl-CoA dehydrogenase type-2 activity KE 1012 Increased, Inhibitory postsynaptic potential KE 1014 Induction, Somatic muscle paralysis KE 761 Increased, Chloride conductance KE 1015 Increased, Neuronal synaptic inhibition KE 1016 Inhibition, Feeding KE 1305 Increase, cytosolic fatty acid KE 459 Increased, Liver Steatosis KE 1115 Increased, Reactive oxygen species KE 1491 Increased, Oncotic Necrosis	**AO 459 Increased, Liver Steatosis** **AO 351 Increased Mortality** **AO 1489 N/A, Steatohepatisis**				-		
Tetrahydrofuran	109-99-9	**AOP Links: 60**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1021328#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis	https://aopwiki.org/aops/60	245 Activation, PXR/SXR	https://aopwiki.org/events/245	471 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36 465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid	**459 Increased, Liver Steatosis**			aAOP#109-99-9.jpg		
Tetrakis(dimethylamino) titanium	3275-24-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3062946#exec_sum									-		

Tetramethyl ammonium hydroxide	75-59-2 10424-66-5 (trihydrate) 10424-65-4 (pentahydrate)	**AOP Links: 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3029108#exec_sum	Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/200	1181 Activation, Estrogen receptor	https://aopwiki.org/events/1181	1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts 1198 Activation, Macrophages 1213 Increased, Angiogenesis 1239 Altered, Gene Expression 1240 Altered, Protein Production 1241 Increased, Motility 1242 Increased, Second Messenger Production	**1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#75-59-2.jpg		
Tetramethylsilane	75-76-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9026423#exec_sum									sAOP#75-76-3.jpg		
Thallium	7440-28-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2036315#exec_sum									-		
Thallium selenide	12039-52-0 15572-25-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6024335#exec_sum									-		
Tin (Sn)	7440-31-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1049801#exec_sum									-		
Tin(II) methanesulfonate	53408-94-9	No AOPs available 190, 202, 265	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1068051#exec_sum	190 Type II iodothyronine deiodinase (DIO2) inhibition leading to altered amphibian metamorphosis 202 Inhibitor binding to topoisomerase II leading to infant leukaemia 265 D1 protein blockage leading to photosystem II (PSII)-inhibition associated growth reduction		MIE 1002 Inhibition, Deiodinase 2 MIE 1252 Binding to (interferes with) topoisomerase II enzyme MIE 1516 Increase, D1 protein blockage		KE 1116 Decreased, Triiodothyronine (T3) in tissues KE 1461 DNA double-strand break KE 1253 MLL chromosomal translocation KE 1517 Decrease, Photosystem II activity KE 1475 Decrease, Photosynthesis KE 1476 Decrease, Glycolysis KE 40 Decrease, Mitochondrial ATP production	**AO 1101 Altered, Amphibian metamorphosis** **AO 1254 Infant leukaemia** **KE 1521 Decrease, Growth**			-		
Tin(II) oxide	21651-19-4	No AOPs available 190, 202, 265	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2066723#exec_sum	190 Type II iodothyronine deiodinase (DIO2) inhibition leading to altered amphibian metamorphosis 202 Inhibitor binding to topoisomerase II leading to infant leukaemia 265 D1 protein blockage leading to photosystem II (PSII)-inhibition associated growth reduction		MIE 1002 Inhibition, Deiodinase 2 MIE 1252 Binding to (interferes with) topoisomerase II enzyme MIE 1516 Increase, D1 protein blockage		KE 1116 Decreased, Triiodothyronine (T3) in tissues KE 1461 DNA double-strand break KE 1253 MLL chromosomal translocation KE 1517 Decrease, Photosystem II activity KE 1475 Decrease, Photosynthesis KE 1476 Decrease, Glycolysis KE 40 Decrease, Mitochondrial ATP production	**AO 1101 Altered, Amphibian metamorphosis** **AO 1254 Infant leukaemia** **KE 1521 Decrease, Growth**			-		
Tin(IV) oxide	18282-10-5	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8042474#exec_sum									-		
Titanium dioxide	13463-67-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID3021352#exec_sum									-		
Titanium nitride	25118-18-8 25583-20-4	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8067109#exec_sum									-		
Titanium tetrachloride	7550-45-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8042476#exec_sum									-		
Toluene	108-88-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7021360#exec_sum							200 Estrogen receptor activation leading to breast cancer MIE 1181 Activation, Estrogen receptor KE 1182 Increase, Cell Proliferation (Epithelial Cells) KE 1183 Decreased, Apoptosis (Epithelial Cells) KE 177 N/A, Mitochondrial dysfunction 1 KE 1088 Increased, Oxidative Stress KE 1187 Increased, ER binding to DNA (classical pathway) KE 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) KE 1189 Increased, Proliferation (Endothelial cells) KE 1190 Increased, Migration (Endothelial Cells) KE 1191 Increased, Non-genomic signaling KE 1192 Increased, Ductal Hyperplasia KE 1194 Increase, DNA damage KE 1195 modulation, Extracellular Matrix Composition KE 1196 Increased, Invasion KE 1197 Activation, Fibroblasts KE 1198 Activation, Macrophages KE 1213 Increased, Angiogenesis KE 1239 Altered, Gene Expression KE 1240 Altered, Protein Production	55년생, 여성 (유방암)	sAOP#108-88-3.jpg	- QTS(용연), 반도체 - 리벨링, 리페어, 스태킹/오픈레이터	- 산화에틸렌, 스토다드 솔벤트, 니트로메탄, 납, 스티렌, 염화메틸렌, 에틸에틸케톤, 톨루엔 등
trans-2,3-dichlorobut-2-ene	110-57-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID6020434#exec_sum									sAOP#110-57-6.jpg	Carcinogenicity	
Trichloroethylene	79-01-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0021383#exec_sum							187 Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage MIE 1134 Ireversible inhibition of hepatic VKOR by binding of AR at tyrosine 139, Failure to cycle vitamin K epoxide to vitamin K to form vitamin K hydroquinone MIE 1138 Uncoupling of oxidative phosphorylation, Reduced ability to generate ATP MIE 1169 Anticoagulant rodenticide interferes with carboxylation of Gla proteins in bone, Impairment of post-translational modification (carboxylation) of osteocalcin KE 1122 Under carboxylated clotting factors will not assemble on cell surfaces to form clot, Failure of secondary hemostasis KE 1130 Failure in vascular repair mechanisms, Unresolved blood loss (hemorrhage) KE 1131 Failure in gamma-glutamyl carboxylation of clotting factors II, VII, IX and X, Under carboxylation of clotting factors (e.g., des-gamma-carboxy prothrombin) KE 1132 Blood loss and development of anemia.	76년생, 여성 (재생불량성빈혈)	sAOP#79-01-6.jpg	- 삼성전자(기흥,온양),반도체 - 드림홈, 솔더링/오픈레이터	남 변전 포름알데히드 TCE 등
Trichlorosilane	10025-78-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID4029301#exec_sum									-		
Triethyl borate	150-46-9	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2041674#exec_sum									-		
Triethylindium	923-34-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1061281#exec_sum									-		
Trifluoro methane	75-46-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0026410#exec_sum									-		
Trifluoro(tetrahydrofuran)boron	462-34-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2060044#exec_sum									-		

Trimellitic anhydride	552-30-7	**AOP Links: 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID7026235#exec_sum	Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/200	1181 Activation, Estrogen receptor	https://aopwiki.org/events/1181	1182 Increase, Cell Proliferation (Epithelial Cells) 1183 Decreased, Apoptosis (Epithelial Cells) 177 N/A, Mitochondrial dysfunction 1 1088 Increased, Oxidative Stress 1187 Increased, ER binding to DNA (classical pathway) 1188 Increased, ER binding to T.F. to DNA (non-classical pathway) 1189 Increased, Proliferation (Endothelial cells) 1190 Increased, Migration (Endothelial Cells) 1191 Increased, Non-genomic signaling 1192 Increased, Ductal Hyperplasia 1194 Increase, DNA damage 1195 modulation, Extracellular Matrix Composition 1196 Increased, Invasion 1197 Activation, Fibroblasts 1198 Activation, Macrophages 1213 Increased, Angiogenesis 1239 Altered, Gene Expression 1240 Altered, Protein Production 1241 Increased, Motility 1242 Increased, Second Messenger Production	**1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#552-30-7.jpg		
Trimethyl borate	121-43-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0037738#exec_sum									-		
Trimethyl phosphate	512-56-1	**AOP Links: 60**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1021403#exec_sum	NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis	https://aopwiki.org/aops/60	245 Activation, PXR/SXR	https://aopwiki.org/events/245	471 Inhibition, FoxA2 Inhibition, FoxA2 179 Decreased, Mitochondrial fatty acid beta-oxidation 472 Down Regulation, CPT1A 474 Down Regulation, HMGCS2 462 Up Regulation, SCD-1 54 Up Regulation, CD36 465 Increased, FA Influx 477 Decreased, Ketogenesis 454 Increased, Triglyceride formation 327 Accumulation, Fatty acid	**459 Increased, Liver Steatosis**			sAOP#512-56-1.jpg		
Trimethylaluminum	75-24-1	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9058787#exec_sum									-		
Trimethylborane	593-90-8	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9020803#exec_sum									-		
Trimethylgallium	1445-79-0	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2061696#exec_sum									-		
Trimethylindium	3385-78-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9018740#exec_sum									-		
Tungsten	7440-33-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8052481#exec_sum									-		
Tungsten hexafluoride	7783-82-6	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID8089177#exec_sum									-		
Vinyltrimethylsilane	754-05-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID1061071#exec_sum									-		
Xylene	1330-20-7	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2021466#exec_sum							160 Ionotropic gamma-aminobutyric acid receptor activation mediated neurotransmission inhibition leading to mortality MIE 762 Activation, ionotropic GABA Receptor chloride channel KE 1012 Increased, Inhibitory postsynaptic potential KE 1014 Induction, Somatic muscle paralysis KE 761 Increased, Chloride conductance KE 1015 Increased, Neuronal synaptic inhibition KE 1016 Inhibition, Feeding KE 763 Increased, Mortality	84년생, 여성 (다발성경화증)	-	- 상성전자(기종),_반도체 - CMP, 세정, Metal, 포토, CVD, 식각, 검사/오퍼레이터	- 아세톤, 신너, 벤젠, 톨루엔, 크실렌, 페놀, 크레졸, 2-에톡시에탄올, 황산 등
Zinc chloride fume	7646-85-7	**AOP Links: 58, 60, 61, 66, 113, 124, 150, 161, 187, 200**	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2035013#exec_sum	NR1I3 (CAR) suppression leading to hepatic steatosis NR1I2 (Pregnane X Receptor, PXR) activation leading to hepatic steatosis NFE2L2/FXR activation leading to hepatic steatosis Modulation of Adult Leydig Cell Function Subsequent Glucocorticoid Activation in the Fetal Testis HMG-CoA reductase inhibition leading to decreased fertility Aryl hydrocarbon receptor activation leading to early life stage mortality, via reduced VEGF Anticoagulant rodenticide inhibition of vitamin K epoxide reductase resulting coagulopathy and hemorrhage Estrogen receptor activation leading to breast cancer	https://aopwiki.org/aops/58 https://aopwiki.org/aops/60 https://aopwiki.org/aops/61 https://aopwiki.org/aops/66 https://aopwiki.org/aops/124 https://aopwiki.org/aops/150 https://aopwiki.org/aops/187 https://aopwiki.org/aops/200	456Suppression,Constitutiveandrostanereceptor,NR1I3 468Inhibition,PPARalpha 167Activation,LXR 228peroxisomeproliferatoractivatedreceptorpromoterdemethylation 245 Activation, PXR/SXR 478Activation,NRF2 479Activation,NR1H4 653Decreasedtestosteronebythefetal Leydigcells,Increasedcorticosterone 654Decreasedtestosteronebythefetal Leydigcells,Activationbyothergluccorticoidreceptoragonists 804 Inhibition, HMG-CoA reductase 18 Activation, AhR 1134Irreversibleinhibitionofhepatic VKORbybindingofARattyrosine139,FailuretocyclevitaminKepoxidetovitaminKtoformvitaminKhydroquinone 1138Uncouplingofoxidativephosphorylation,ReducedabilitytogenerateATP 1169AnticoagulantrodenticideinterfereswithcarboxylationofGlaproteinsinbone,Impairmentofpost-translationalmodification(carboxylation)ofosteocalcin 1181 Activation, Estrogen receptor	https://aopwiki.org/events/456 https://aopwiki.org/events/468 https://aopwiki.org/events/167 https://aopwiki.org/events/228 https://aopwiki.org/events/245 https://aopwiki.org/events/478 https://aopwiki.org/events/479 https://aopwiki.org/events/653 https://aopwiki.org/events/654 https://aopwiki.org/events/804 https://aopwiki.org/events/18 https://aopwiki.org/events/1134 https://aopwiki.org/events/1138 https://aopwiki.org/events/1169 https://aopwiki.org/events/1181	457Activation,SREBF1 66Activation,ChREBP 458Increased,DeNovoFAsynthesis 454Increased,Triglyceride formation 54UpRegulation,CD36 462UpRegulation,SCD-1 463UpRegulation,FAS 451Inhibition,Mitochondrialfattyacidbeta-oxidation 327Accumulation,Fattyacid 470UpRegulation,Acetyl-CoAcarboxylase-1(ACC-1) 465Increased,FAInflux 471Inhibition,FoxA2Inhibition,FoxA2 179Decreased,Mitochondrialfattyacidbeta-oxidation 472DownRegulation,CPT1A 474DownRegulation,HMGCS2 462UpRegulation,SCD-1 54UpRegulation,CD36 465Increased,FAInflux 477Decreased,Ketogenesis 454Increased,Triglyceride formation 327Accumulation,Fattyacid 480Activation,SHP 227Activation,PPARα 482Decreased,DHB4/HSD17B4 451Inhibition,Mitochondrialfattyacidbeta-oxidation	**459 Increased, Liver Steatosis** **505 Decreased sperm quantity / quality in the adult, Decreased fertility** **330 Decrease, Fertility** **947 Increase, Early Life Stage Mortality** **1136 Impaired recruitment, Population trajectory** **1193 N/A, Breast Cancer**	https://aopwiki.org/system/dragonfly/production/2018/03/28/fbtzinwepy_AOP_150_graphical_representation_March_28_2018.jpg https://aopwiki.org/system/dragonfly/production/2016/11/29/11dAop-200.jpg		sAOP#7646-85-7.jpg		
Zinc oxide	1314-13-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2035016#exec_sum									-		
Zinc telluride	1315-11-3	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID0061664#exec_sum									-		
Zirconium boride	12045-64-6 12046-91-2	No AOPs available	https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID5065223#exec_sum https://comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID2010426#exec_sum									-		