QSAR model for genotoxicity (*in vivo micronucleus test*) (v1.0)

ProtoTOX
by ProtoQSAR

ProtoTOX

ProtoTOX is a computational (*in silico*) tool focused on the prediction of endpoints related with the toxicity of chemical substances. It includes a variety of *in vitro* and *in vivo* tests in humans, animals, microorganisms and cell lines.

ProtoTOX mainly includes, but is not limited to, endpoints used by REACH, a European Union regulation, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry.

Endpoint

Human health effects: Mutagenicity/Genotoxicity. Mammalian erythrocyte micronucleus test.

Mutagenicity refers to the induction of permanent transmissible changes in the amount or structure of the genetic material of cells or organisms. Genotoxicity is a broader term and refers to processes which alter the structure, information content or segregation of DNA and are not necessarily associated with mutagenicity. *In vivo* mammalian erythrocyte micronucleus test is a measure of *in vivo* chromosomal mutagenicity. The test identifies substances that cause micronuclei in erythroblasts sampled from bone marrow and/or peripheral blood cells of animals, usually rodents. These micronuclei originate from acentric fragments or whole chromosomes, and the test thus has the potential to detect both clastogenic and aneugenic substances.

Metrics

Training set

Experimental values	QSAR predictions	
	non-cytotoxic	**cytotoxic**
non-cytotoxic	60	22
cytotoxic	29	92

Validation set

Experimental values	QSAR predictions	
	non-cytotoxic	**cytotoxic**
non-cytotoxic	23	13
cytotoxic	10	23

Parameters	Training	Validation
Accuracy	0.75	0.67
Sensitivity / recall	0.76	0.70
Specificity	0.73	0.64
Precision	0.81	0.64
Negative predictive value	0.67	0.70
F-score	0.78	0.67
Matthews Correlation Coefficient	0.49	0.34
Critical Success Index	0.64	0.50
Area under the ROC	0.75	0.67

ProtoTOX is part of

ProtoPRED

ProtoPRED platform allows the easy, fast and user-friendly prediction of different properties of chemical compounds, by proprietary (Q)SAR models.

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