

A new strategy to exploit read-across for toxicity evaluation

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Read-across is becoming a more and more sophisticated technique, applying multiple metrics to identify similar substances. Recently we introduced VERA within the VEGAHUB platform (www.vegahub.eu). VERA was implemented to identify similar substances for two endpoints, carcinogenicity and fish acute toxicity. For the first endpoint VERA identifies a binary label, while for the second endpoint a continuous value is proposed. VERA, as in VEGAHUB, uses rules for the adverse effect, molecular groups and structural similarity.

In this study we extended the metrics to investigate the similarity between substances. Several features useful to compare the behaviour of the chemical compounds on a purely chemical point of view have been applied, such as polarity, reactivity, steric properties. Physico-chemical properties have been used too. Furthermore, the information about the transformation of one substance into a second one is used. These features, added to the others already present in VERA, provide a more powerful and flexible system to compare the behaviour of different substances. A large set of substances is used for the comparison, and for each feature the potency of the feature is split in three categories (high, medium, and low) and this information is combined for the different features, to identify the best similar substances.

Examples have been investigated for different applications.