Highlight report: reporter cell lines for prediction of skin sensitization

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Recently, Andreas Natsch and Roger Emter have contributed a comprehensive review article about reporter cell lines for skin sensitization testing (Natsch and Emter 2015). In the past years, several studies addressed the response of cell lines and also primary cells to skin sensitizers at the transcription level. Although the sets of up- and down-regulated genes were divergent, nevertheless three commonly found responses were identified, namely the Keap1-Nrf2-ARE pathway, the heat shock response, and cytokine/inflammatory genes (Natsch and Emter 2015). Therefore, it is apparent to establish reporter cell lines that indicate activation of these pathways. In their review, Natsch and Emter (2015) summarize the presently available cell systems and discuss their possibilities and limitations.

Currently, skin toxicology represents a cutting-edge topic (Pastore et al. 2014a, b; Takeda et al. 2014; Berthet et al. 2014; Schwarz et al. 2013; van der Veen et al. 2013) and a relatively high number of studies have focused on the metabolic capacity of skin in vitro systems (Oesch et al. 2014; Eilstein et al. 2014; Fabian et al. 2013; Esser and Götz 2013). The present intensive research activities on skin models are part of a larger development that aims at establishing alternatives to animal tests, particularly in the fields of neurotoxicity (Shinde et al. 2015; Meganathan et al. 2015; Weng et al. 2014; Krug et al. 2013; Waldmann et al. 2014) and liver toxicity (Godoy et al. 2009, 2013, 2015; Drasdo et al. 2014a, b; Hoehme et al. 2010; Schliess et al. 2014; Grinberg et al. 2014; Reif 2014). However,

the possibilities and limitations of the currently available in vitro systems have also been critically discussed (Ghallab 2013, 2014a, b; Godoy 2011). One limitation is the inaccuracy in predicting lowest observed effect concentrations in vivo. Also, Natsch and Emter critically discuss that in vitro systems including reporter assays represent surrogate measurements whose relationship to adverse outcomes in vivo still needs to be better defined (Natsch and Emter 2015). The review is highly recommended to anyone working in the field of alternative methods.

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