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EDITORIAL

Highlight report: diagnostic systems for the analysis of immune functions in humans

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It is well established that the immune system is essential for protection from infections and transformed cells and also plays a key role in prognosis of carcinomas (Schmidt et al. 2008, 2012). However, because of the complexity of the human immune system, a generally accepted, validated diagnostic system to evaluate the overall status of immune functions has not yet been established. It is well established that many endogenous and exogenous factors, for example, sex and age (Giefing-Kroll et al. 2015), chemicals (Casey et al. 2015; Fasbender et al. 2016; Grinberg et al. 2014), nutrition (Veldhoen and Ferreira 2015), sports (Walsh et al. 2011) and of course diseases (Xia et al. 2015; Ashraf et al. 2015), influence immune functions. Therefore, establishment of a diagnostic immune panel represents a challenging task, complicated by large individual differences due to environmental and genetic factors.

In the previous issue of the Archives of Toxicology, Maren Claus and colleagues from the Leibniz Research Centre (IfADo) in Dortmund have to our knowledge for the first time resented a comprehensive panel for global evaluation of human immune functions (Claus et al. 2016). This panel includes (1) six antibody panels to determine absolute numbers of lymphocyte subsets by multicolor flow cytometry; (2) a set of assays of T cell, NK cell and monocyte key functions and (3) a cytokine panel. These methods require only small amounts of samples, which can easily be obtained from 10 ml of venous blood. This panel has now been applied to a group of healthy volunteers to determine baseline variability. Further studies have been initiated to study the novel immune cell panel in relation to chemical exposure but also stress and age, and it will be included into the Dortmund vital study, a cohort of 500 healthy individuals that will be reevaluated every 5 years.

Numerous studies have already addressed the role of immune cells in toxicity induced by chemicals (Godoy et al. 2013; Kadow et al. 2011; Gagnaire et al. 2014; Sánchez-Moreno et al. 2015) or drugs (Schmeits et al. 2015; Volarevic et al. 2015; Wang and Ning 2014; Choi et al. 2015; Chen et al. 2015). However, the hunt for a global diagnostic system to detect compromised immune functions has only just begun.

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