

**Dear readers,**

Almost 11.5 million animals were used for experimental purposes in the 27 member states of the European Union in 2011. The good news is that this number is lower by half a million than at the last count three years ago. However, we see that last year's coming into force of the final elements of the Cosmetics Regulation will only make a tiny dent in this stately sum: less than 2500 animals were used for the toxicological evaluation of cosmetics and toiletries in 2011. As the lion's share of experimental animals lies in basic research as well as medical, veterinary, and dental drug discovery and development, we must hope that last year's critical articles demonstrating the extremely low predictive value of animal studies for exemplary human diseases (e.g., Seok et al., *PNAS* 110, 3507-3512) and showing the extremely high rate of attrition of drugs that have passed animal studies in the subsequent clinical studies (e.g., Hartung et al., 2013, *ALTEX* 30, 275-291) will lead to a reassessment of the value placed on data from animal experiments, especially in these areas, and entice more scientists to seek alternative methods that provide better data.

Refinement is the title of the Food for Thought ... contribution in this issue. Joanne Zurlo and Eric Hutchinson point out that advances in refinement, such as social housing and positive reinforcement training, that benefit the animals' well-being and also the reliability of the results have not been implemented to the extent possible and require more consideration. Cold stress, pain control, and humane euthanasia of rodents are further issues in need of timely attention.

Two research articles in this issue are from the area of predictive toxicology, two describe alternative methods for antibody production:

Kristine Kongsbak and colleagues apply a systems toxicology approach to link chemicals with diseases. They mined existing databases for known interactions of five mold-killers with genes and their respective proteins. Next, they investigated which other proteins these proteins form complexes with. Then they looked for associations of these protein complexes with diseases and found reproductive diseases as the largest disease cluster. The approach may help to build hypotheses about potential adverse effects of chemicals in the environment on human health; it could identify which chemicals in a mixture might contribute to causing adverse effects, even though they may not do so separately, and which chemicals might result in similar adverse effects despite different mechanisms of action. Andrea Gissi et al. describe their computational approach to predict the bioconcentration factor of chemicals, a

value describing to what extent a chemical may accumulate in water organisms if released into the environment. Such data is required for the risk assessment of chemicals and pesticides. They demonstrate the usefulness of this computational approach if applied with expert knowledge.

Recombinant antibody technology is an animal-free alternative to the widely used hybridoma technology by which monoclonal antibodies are produced in mice. Cedric Blanc and colleagues here describe a simple and robust phage display protocol for the isolation of large quantities of specific antibodies tested successfully on seven different targets. And Renata Grzywa et al. describe the successful isolation of polyclonal antibodies against an antigen used for the diagnosis of breast cancer from egg yolks. This method reduces the burden on the immunized animals significantly, as they do not need to be bled for serum regularly, and provides a highly cost-effective alternative to immunization of mammals for this purpose. The usefulness of the antibodies is demonstrated by the development of a highly sensitive diagnostic method.

Daland Juberg and colleagues report on a workshop on the performance to date of endocrine disruptor screening assays, the practical application of the results, and opportunities for the future of the Endocrine Disruptor Screening Program. Events in cells that lead to adverse events or disease may be processes that are not normally active but are triggered, e.g., by toxins, or may be normal processes that are disturbed by such triggers. These concepts are combined under the term "Pathways of Toxicity." In a t⁴ workshop Andre Kleensang et al. have developed a working definition of "Pathways of Toxicity" (PoT) and a concept for the development of a PoT database that may be fed and used by a variety of scientific interest groups.

Three Symposium Reports, Corners, and the News bring you up to date on global developments in the field of alternative methods.

You will notice that articles in ALTEX now have digital object identifiers (DOI), which make finding references and cross-linking easier. We will also be introducing DOIs in the references.

Wishing you all the best for the year ahead,

Sonja von Aulock
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