Session II Roundtable Summary

In this guide

In this guide

Session II Roundtable Summary

How should we consider chemical-microbiome interactions from the two aspects: microbiome modulation of toxicity and the toxicant modulation of the microbiome?

- The ADI and the NOAEL were deemed an important and effective way of establishing what is a measurable concern of the microbiota.
- The gut microbiota may be a tool to protect a therapeutic target.
- Consider whether the effects seen are reversible and whether a toxicological end point refers to permanent damage or a temporary fluctuation.
- There was a view that the microbiome was unique for an individual; however, there could be potential trends and/or patterns to establish principles to help assess the risk. For example, correlating genetics, disease states, groups that are on certain medications to the metabolome produced by their microbiota.
- The importance of understanding the mechanism of action of a chemical was reiterated as this information is necessary to understand any health effects and would be required before meaningful risk assessment could be undertaken.
- When looking at the effects of the microbiome, it is important to also look at pre-conception, as the next generation would be exposed from stages well before conception, so would need to include information on *e.g.* fertility and developmental effects.

How can chemicals be tested for the effects of concern resulting from changes in the microbiome?

- Discussion arose around using animal models. Pigs seem to be a useful model organism as their microbiome reflects that of a human quite closely.
- Use of animals isn’t allowed for testing of cosmetics so therefore *in vitro* methodologies need to be used but there are questions on whether the hugely complex interactions that occur in the microbiome can be fully reflected by *in vitro* tests or indeed by *in vivo* tests not conducted in humans.
- With regards to the skin microbiome, questions arose on the restrictions on using animal models when studying the impact of pollutants on the skin microbiome.
- The importance of cause and effect was raised, specifically the need to understand if a change in the human microbiome was due to the action of the microbiome on a chemical or the action of the chemical on the microbiome. It was indicated that there is currently not enough information available to understand the pathology associated with fluctuations in the

human microbiome.

- Simplified *in vivo* models can help establish baselines across populations, before establishing effects of chemicals on the microbiome
- Some attendees disagreed that the standard OECD test guidelines for *in vivo* toxicity studies were suitable for determining effects on the microbiome. OECD guideline studies did not reveal a difference in a microbiome population and/or functionality in a 90-day rodent study, whereas omics analyses did, and current development of these techniques is resulting in a more confident prediction of health outcomes.

Main themes

- Sensitive indicators and biomarkers of dysbiosis.
- Causation vs Correlation.
- The ADI and the NOAEL were deemed useful concepts in establishing what is an impact of concern on the microbiota.