



The Federal Institute for Risk Assessment (BfR) is the national institute which prepares expert reports and opinions on questions of food, feed and chemical safety, as well as consumer health protection, on the basis of internationally recognised scientific assessment criteria. It advises the German government and other institutions and interest groups in these areas. The BfR conducts its own research on topics closely related to its assessment tasks. It is a legally responsible institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL). The BfR has its headquarters in Berlin.

At the “Allergy study center” at the Department for Chemicals and Product Safety at BfR there is an opening for a

Master/Diploma Thesis

on the topic:

Toxic effects and specific activation of CD4+ T cells at different metal salt concentrations

About 20% of the population is affected by a contact allergy, most commonly to nickel. Studies of different time periods and geographical areas show that about 30% of nickel-allergic persons are also allergic to cobalt. Co-sensitization with palladium is common, too. To date, it is unclear - as with other co-sensitizations - whether the underlying cause is co-exposure or cross-reactivity of specific T cells that mediate the contact allergy.

Our laboratory combines newly developed techniques for the detection of contact allergen-specific T cells based on the rapid expression of CD154 (CD40L) by activated CD4+ T cells and high-throughput sequencing of the involved T cell receptors. We have applied this method to nickel-specific T cells in allergic and non-allergic individuals (Aparicio-Soto et al., 2020). In this project, the same approach will be applied to other metal contact allergens. This will allow an analysis of the characteristics of different metal-specific T cell receptor repertoires to clarify whether co-sensitization is due to the recognition of different metals by the same T cell clones. In the long term, our work should contribute to the understanding of the prevalence of metal allergies, especially with regard to co-sensitization, in order to find reasonable exposure limits and new diagnostic and predictive approaches.

Duties:

- The aim is to determine suitable metal salt concentrations and metal salt compounds for the use in our T cell assays. For instance, the analysis of cobalt and palladium salts is planned.
- For this purpose, the toxicity and frequency of activated T cells for the metal salts will be measured.
- The specificity of the activated cells will be confirmed by a restimulation of single cell clones and a possible inhibition of the MHC-interaction with blocking antibodies.
- The laboratory work will include the following methods: isolation of immune cells from blood samples (PBMCs) that are provided by our clinical cooperation partners, stimulation with different allergens and control antigens, multiparameter flow cytometry including single cell sorting, in vitro culture and expansion of T cell lines and clones, T cell receptor analysis by high throughput sequencing, cytokine analysis by bead-based multiplex assays.

Requirements:

- Highly motivated student with background in biology/immunology/biomedicine or another related field (e.g. biochemistry, toxicology, chemistry, biotechnology, pharmacy)
- Experience with cell cultures or other methods that are relevant to the project would be appreciated but is not a prerequisite
- Very good written and spoken English language skills
- Flexible, engaged and self-organized way of working

We offer an excellently equipped lab environment in a cooperative, interdisciplinary and international research team and comprehensive supervision.

More detailed information is available from Dr. Siewert (phone +49 30 18412-27003) and from Mrs. Riedel (phone +49 30 18412-27005). If you are interested, please send your complete application (including a short letter of motivation, CV, certificates and transcripts and contact information of at least one referee) via E-Mail to Katherina.Siewert@bfr.bund.de and Franziska.Riedel@bfr.bund.de.

The BfR welcomes applications from people of all nationalities. The BfR is an innovative scientific institute offering family-friendly working conditions for which it was awarded the "audit berufundfamilie®" (work and family) certificate. The BfR guarantees equal career opportunities for women and men, and is therefore particularly interested in receiving applications from women. In the case of equal suitability, severely disabled applicants will be given preferential consideration and are only required to have a minimum level of physical suitability.

