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

Bachelor Thesis

on the topic:

Analysis of next generation sequencing data sets of metal-specific T cell receptors

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:

- Participation in the analysis of next generation sequencing data sets of metal-specific T cell receptors.
- For this purpose, the programs MiXCR, MiGec and VDJtools will be applied.
- The automation of the analysis using Python is another goal of the work.
- In addition, new analysis programs (in Python) will be created and existing programs dealing with e.g. the analysis of the amino acid composition of the region involved in antigen recognition, will be improved.

Requirements:

- Highly motivated student with background in bioinformatics, computer science or another related field
- Experience in Python and R is required, experience in the evaluation of next-generation sequencing data sets 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 a cooperative research environment in an interdisciplinary and international 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 application with complete documentation (including a short letter of motivation, CV, certificates and transcripts and contact information of at least one referee) 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.

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Damit die Welt
für Menschen
sicherer wird.

Institution of the
Federal Ministry
of Food
and Agriculture

Zertifikat seit 2009
audit berufundfamilie