The German Federal Institute for Risk Assessment (BfR) is the national institute which prepares expert reports and opinions on questions of food, feed and chemicals, as well as consumer health protection in Germany on the basis of internationally recognized scientific assessment criteria. It advises the German government as well as 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 German Federal Ministry of Food and Agriculture (BMEL).

The BfR Department of Chemical and Product Safety has an immediate vacancy for the following position in the Dermatotoxicology Study Centre.

Master-/Diploma Thesis

on the topic:

Specific activation of CD4+ T cells by recombinant produced food allergens (f/m/x)

About 1-2% of the population is affected by food allergy to crustaceans. These allergies can lead to an anaphylactic shock, thus resulting a life-threatening reaction if the allergens are accidentally consumed. Insects are related organisms to crustaceans and are considered a promising alternative source of protein, as illustrated by an increasing number of applications for use as novel foods in the EU.
However, insects contain significant allergens, such as tropomyosin and arginine kinase, which are also present in crustaceans and house dust mites. Preliminary studies show a possible immunological cross-reactivity to insect allergens in crustacean and house dust mite allergic patients.
The aim of this project is to investigate whether tropomyosin and arginine kinase from insects activate cross-reactive T cells in crustacean and house dust mite allergic individuals. In addition, we plan to study other allergens in insects to investigate possible sensitization by insect foods in the future. For this purpose, we use recombinantly produced proteins and combine them with activation-induced marker (AIM) T cell assays, multiparameter flow cytometry and high-throughput sequencing (HTS) of the involved T cell receptor (TCR) repertoire. The method has already been applied to contact allergens, such as nickel, cobalt, and palladium, in allergic and non-allergic individuals (Aparicio-Soto et al., 2020, https://doi.org/10.1111/all.14322; Riedel et al., 2022, https://doi.org/10.1111/all.15494). In this project, the approach will be applied to food allergens. The work serves as a basis to understand the prevalence of allergies to novel foods and to ensure the best possible protection for allergy sufferers.

Tasks:

- Production of recombinant proteins (allergens or control proteins) using an established expression system.
- Purification and characterization of synthesized proteins by affinity and size exclusion chromatography, gel electrophoresis, western blots, and mass spectrometry
- Detection and quantification of food allergen-specific T cells by AIM T cell assays. Peripheral blood mononuclear cells (PBMCs) are stimulated with recombinant proteins (allergens) as a cellular source.
- Assessment of the cross-reactivity pattern of insect allergen-specific T cells. Single activated food allergen-specific T cells will be sorted, propagated *in vitro* and re-stimulated with different related proteins. In addition, HTS of the involved TCR will be performed.

Requirements:

- Studies in biology/immunology/biomedicine or other related field (e.g., biochemistry, toxicology,
- chemistry, biotechnology, pharmacy)
- Experience with cell cultures or other methods relevant to the project would be helpful, but is not a requirement
- Very good command of written and spoken English
- Flexible, dedicated and self-organized working style

The proposed project is a joint venture between the "Study Center Dermatotoxicology" (Chemical and Product Safety) headed by Dr. Katherina Siewert and Division 51 "Effect-Based Analytics and Toxicogenomics" (Food Safety) headed by Prof. Dr. Albert Braeuning. We offer an excellently equipped laboratory environment, a cooperative research environment in an interdisciplinary and international team, and comprehensive supervision.

Application procedure:
Do you feel addressed? Then please apply by e-mail only to Katherina.Wiewert@bfr.bund.de, cc to Matthias.Winkel@bfr.bund.de. Please send a short motivation letter, CV, certificates and references (BSc) and contact details of at least one reference.

Please send questions regarding the range of duties to:

Dr. Katherina Siewert	phone: 030 18412-57001	e-mail: Katherina.Siewert@bfr.bund.de
Dr. Matthias Winkel	phone: 030 18412 25110	e-mail: Matthias.Winkel@bfr.bund.de

Additional information can be found on the homepage: www.bfr.bund.de/de/stellenanzeigen

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.