Risk Assessment of Toxic and Immunomodulatory Agents (RA)

Program coordinator: Prof.dr. Bert Brunekreef

Objectives and research area

Vision
The common risk assessment ‘paradigm’ distinguishes hazard assessment, exposure assessment, dose-response assessments, risk characterization and management as essential elements of the risk assessment process. The RA program aims to continuously improve the scientific basis for assessment of risks (to human, animal and ecosystem health) of exposure to harmful agents through the food chain and vaccination, in the environment and in occupational settings. The interdisciplinary research done within this program specifically focuses on risks of chemical, biological and physical agents in the general environment, and on veterinary public health issues. Important topics are zoonoses and microbial resistance. Research here focuses specifically on high risk populations with intense animal contact for instance microbial resistance to antibiotics is established in both animal and human populations. Traditionally a major topic is related to food safety. A new research line focusing on health effects among people living in close vicinity of livestock production units has started the last years. Furthermore, allergies to domestic, laboratory and farm animals remained an important topic of interest. Human and environmental health issues related to biological, physical and chemical agents remain important. Major research efforts are devoted to health risks of traffic related air pollutants, electromagnetic fields, persistent organic pollutants, endocrine disrupting compounds and biocides. Side effects of pharmaceuticals and vaccines are also studied, as well as occupational health issues such as risks to health of workers in concentrated animal feeding operations (CAFOs) and the animal feed industry, and veterinarians. Finally, the program addresses ecosystem health issues of various contaminants related to wildlife.

Mission
The RA program is designed to improve the scientific basis for assessment of risk to humans, animals and ecosystems from exposure to potentially harmful agents in the environment, in occupational settings, through vaccination, and through the food chain.

Objectives
The RA program is organized in four research lines with the following objectives:

a. Exposure Assessment & Control
   - Identification and characterization of physical, biological and chemical factors in the environment relevant for human, animal and ecosystem health.
   - Quantification of routes of exposure in the general, occupational and domestic environments.

b. Mechanism of Action & Dose-Response Assessment
   - Studies of availability, dose and mechanism of action of food and health products, pharmaceuticals, biotoxins and environmental contaminants in relation to their potential to induce adverse immune, neural and endocrine effects.
   - Development of novel in vitro methods to reduce the number of animals tested and develops prediction methods for the in vivo situation.
c. Environment & Host Response Modulation
- Studies on immune modulation in relation to chronic immune-mediated diseases (e.g. allergies and autoimmune diseases).
- Studies of the immunological mechanisms of agents such as microbial components (including vaccines), probiotics, adjuvants, chemicals, pharmaceuticals and aeroallergens.

d. Environmental Epidemiology (formerly called population studies)
- Studies on the relationships between exposure to biological (e.g. bacterial toxins and allergens), physical and chemical agents and health effects in human populations in the general environment, domestic and occupational settings.
- Studies with a special focus on veterinary public health issues resulting from interactions between animals and humans, their resulting exposures and possible adverse health effects.

Composition of the research program

Research organization
The RA program combines four research groups of the Faculty of Veterinary Medicine that each contributes their unique disciplinary expertise. The research groups participating in the RA program are:

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<tr>
<th>Group</th>
<th>Department(s)</th>
<th>Group coordinator</th>
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<tr>
<td>Brunekreef</td>
<td>Institute for Risk Assessment Sciences (IRAS)</td>
<td>Prof.dr. Bert Brunekreef</td>
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<td>Van den Berg</td>
<td>Institute for Risk Assessment Sciences (IRAS)</td>
<td>Prof.dr. Martin van den Berg</td>
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<tr>
<td>Van Eden (RATIA)</td>
<td>Infectious Diseases &amp; Immunology (I&amp;I) + Institute for Risk Assessment Sciences</td>
<td>Prof.dr. Willem van Eden</td>
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<td>Heederik</td>
<td>Institute for Risk Assessment Sciences (IRAS)</td>
<td>Prof.dr. Dick Heederik</td>
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Research lines:
- Exposure Assessment and Control - Prof. dr. Bert Brunekreef
- Mechanisms of Action - Prof. dr. Martin van den Berg
- Environment, Host-Response Modulation - Prof. dr. Willem van Eden
- Environmental Epidemiology - Prof. dr. Dick Heederik
Key publications

**Exposure Assessment and Control - Prof. dr. Bert Brunekreef**


**Mechanisms of Action - Prof. dr. Martin van den Berg**


**Environment, Host-Response Modulation - Prof. dr. Willem van Eden**

Environmental Epidemiology - Prof. dr. Dick Heederik

