



International PhD Program ICA

The University of Salzburg invites applications for 3 fully funded PhD studentships. The ICA program comprises ten internationally renowned research groups and focuses on specific immunological aspects of cancer and allergy.

ICA aims to attract and select high-calibre graduate students from all over the world, provide an intellectually stimulating environment, excellent infrastructure and ambitious scientific projects. ICA will train young scientists to the highest international standards preparing them for a successful career in basic as well as translational and applied science.

Thesis projects:

- Fused-allergen peptides as T cell epitopes and processing of MHCII-bound antigens by endolysosomal proteases
- Allergens attached to nanoparticles and impact on protein (allergen) processing
- Allergenicity and immunogenicity of pollen antigens

ICA offers numerous benefits to its students: attractive salaries for a period of 3 years (including health, occupational and national insurance), cover of research consumables, ICA-specific technological training courses, transferrable/soft skill courses, full funding of participation in congresses, workshops and international courses, including stays in foreign partner laboratories (up to 6 months).

For detailed information about application, selection procedure and admission, and about the scientific program and faculty of ICA visit

<http://www.uni-salzburg.at/phd-program-ica>

Albert Duschl

A project on nanosafety and bio/nano interaction is available in the group, focusing on the interaction of nanoparticles and allergenic proteins:

Allergens attached to nanoparticles and impact on protein (allergen) processing

Keywords

Interactions between nanomaterials and the immune system: Immunology, allergy, inflammation, bio/nano-interaction, nanosafety

Research interest of the Faculty Member

We are working on the regulation of immune responses by external factors, focussing on the interaction between nanoparticles and the human immune system. The current boom in nanotechnology may create safety hazards, but also promises groundbreaking applications, including medical ones. Against this background, investigations into nano-bio-interactions and into molecular mechanisms of immune cell regulation have developed as our major areas of research, pursued mainly *in vitro* and using various cell culture models.

Key interests include

- protein/allergen-nanoparticle interactions
- nanoparticle uptake and processing of attached proteins in immune cells
- advanced *in vitro* models for mimicking nanoparticles inhalation
- translocation of nanoparticles across biological barriers
- modulation of immune responses (therapeutic or hazardous)
- type II inflammation leading to allergies
- translating knowledge on nanosafety to the real world,

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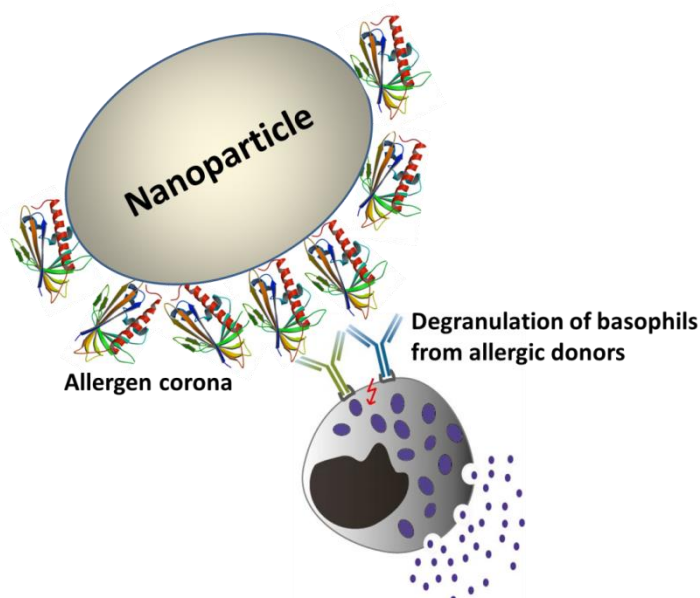


Figure 1. Addressing the allergic effector function. Structural changes / spatial accumulation of allergens (here: birch pollen allergen Bet v 1, protein database entry 1bv1) at the surface of nanoparticles may lead to alterations of the allergic response.

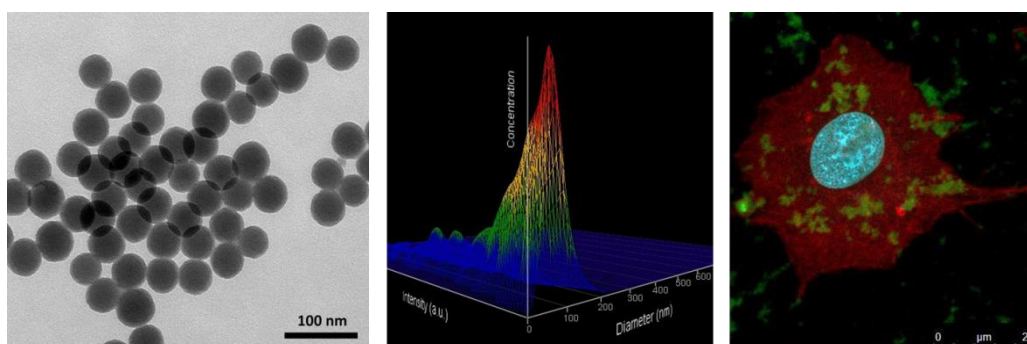


Figure 2. Characterization of nanoparticles and their biological effects. Left to right: TEM image of in house-produced SiO₂ nanoparticles; size distribution analysis of SiO₂ nanoparticles using NanoSight® nanoparticle tracking analysis; CLSM image of an A549 lung epithelial cell containing agglomerates of fluorescently labelled TiO₂ nanoparticles.

Selected publications

- Frijns, E. et al. 2017. *Environ Sci Technol*, 51:5259-5269. ACS editor's choice. Cover page.
- Himly, M. et al. 2017. *Front Immunol*, 8:471.
- Marquez A. et al. 2017. *J Nanobiotechnol*. 15:55.
- da Luz, C.M. et al. 2017. *J Nanobiotechnol*. 15:11.
- Radauer-Preiml, I. et al. 2016. *Part Fibre Toxicol* 13:3.

Links

<https://www.uni-salzburg.at/tapir>

<https://www.uni-salzburg.at/himly>

<https://www.uni-salzburg.at/nan-o-style>

https://www.bionanonet.at/images/BioNanoNet_News_2017_03.pdf

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