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Active and passive immunization against type 2 diabetes mellitus

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Amyloid aggregates composed of extracellular fibrils of islet amyloid polypeptide (IAPP, also called amylin)- a peptide synthetized in the pancreatic β-cells and co-secreted with insulin are found in most type 2 diabetes mellitus (T2DM) patients and has been associated with the progression of the disease. As aggregates are considered to be a key factor in β cell death, we aim at developing a vaccine targeting these pathogenic aggregates to prevent and/or reverse accumulation and enhancing β cell survival. To study this, a transgenic mouse model expressing human IAPP (hIAPP) is used. The vaccines were designed using amylin peptide sequences chemically cross-linked to virus like particles (VLPs). To test the induced antibodies response against each peptide, C57BL/6 mice were immunized and the serum antibodies were analyzed by ELISA assay. The peptides coupled to the VLPs inducing the highest IgG titers against IAPP were tested in the mouse model. Monitoring analysis of the transgenic mice showed spontaneous development of T2DM around the 8th week of age only in the homozygous male group. For this reason, immunizations with the vaccine were performed only in these mice. Interestingly, the first analyzed group of immunized male transgenic mice showed no symptoms of T2DM up to 12 weeks. We are currently repeating these experiments to assess inflammatory state, hIAPP load and disease progression.

Biography

Elisa Roesti has completed her BSc and MSc in Molecular Biology from the University of Basel in 2015. She is currently in the lab of Professor Dr. Martin Bachmann as a PhD candidate investigating the role of virus-like particle (VLPs) as vaccine platforms against chronic diseases, in particular against type 2 diabetes mellitus.

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