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Synthetic virus-like particles in vaccine design

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A new vaccine delivery system will be presented that exploits lipopeptide self-assembly into nanoparticles in the 20-30 nm size range. The assemblies resemble small VLPs in that they contain the same components (i.e. protein and lipid) arranged in a highly repetitive fashion. Antigens of choice, including synthetic antigen mimetics (SAMs), glycopeptides, haptens and small synthetic proteins can be conjugated to these „Synthetic Virus-like Particles" (SVLPs) for multivalent display and delivery to immunocompetent cells. Immunogenicity studies conducted so far in small animals have shown that SVLPs are highly immunogenic, without the need for co-administration of an adjuvant. In contrast to VLPs produced in cells, the lipopeptide building blocks can be produced by chemical synthesis, thereby avoiding risk of contamination with biological agents, and facilitating QC and registration. Moreover, SVLPs can be optimized through structure-activity relationship studies and their properties can be tailored using a myriad of synthetic chemical methods. For example, promiscuous T-helper epitopes, and ligands to enhance presentation by DCs have been incorporated into SVLPs in order to enhance immune responses. The talk will illustrate the SVLP-based approach for vaccine design, with examples from our recent research.

Biography

Dr. Ghasparian studied chemistry at the University of Zurich. After receiving his diploma in 2004 he joined the group of Prof. J. A. Robinson at the University of Zurich as a PhD student, where he worked on synthetic vaccine design and co-invented the SVLP technology. After a short period as a postdoctoral researcher he co-founded Virometix Ltd. in late 2009, where he is now CSO.