Q&A SESSION WITH PHILIPP SPYCHER

PHILIPP SPYCHER, PSI Founder Fellow, **Paul Scherrer Institute (PSI)**

Dr. Spycher is a PSI Founder Fellow at the Paul Scherrer Institute (PSI) Villigen (Switzerland) since end of 2017 working on the site-specific modification of native antibodies. He studied at the University of Basel (Switzerland) Nanoscience and at ETH Zurich (Switzerland) Biomedical Engineering with a focus on drug delivery and targeting. During his doctoral studies at ETH Zurich, he worked on protein and materials engineering for the site-specific immobilization of proteins onto micro-patterned surfaces using enzymes. He then performed a post-doc at PSI Villigen on chemical and site-specific modification of antibodies and fragments for diagnostic and therapeutic applications. Dr. Spycher has over 8 years of experience with ADCs and materials engineering, he is particularly interested in the development of improved drug delivery and targeting systems.

What are the most important technologies impacting Proteins and Antibody engineering market?

We consider the most important technologies to be antibody-drug conjugates (ADCs), bispecific antibodies, and particularly, their combination: bispecific ADCs or biparatopic ADCs. These types of molecules hold great promises which are difficult to be tackled with traditional antibodies. For example, bispecific ADCs can enable an improved cellular uptake and hence an increased delivery of the cytotoxic compounds to the malicious cells can be achieved. We also think that attaching immuno-stimulatory agents to antibodies instead of cytotoxic payloads to specifically re-direct and/or activate (dormant) immune-cells to the cancer site, holds considerable potential. Rapidly attaching such compounds in a defined manner to native or bispecific antibodies, as we can do, will help companies to quickly identify their lead compounds and develop a very interesting new class of compounds.

What are the key challenges for 2019?

One of the major problems in site-specific drug conjugation to antibodies or bispecific antibodies is, in our opinion, the time, costs and efforts needed for drug attachment which makes high-throughput screening very challenging. Furthermore, the generation or manufacturing of bispecific or biparatopic antibodies is not an easy task and can become a problem. Particularly, the up-scaling of these often needs increased attention to prevent it becoming an insurmountable barrier. Thus, in order that such highly advanced molecules can fully enable their potential as outlined above significant efforts should also be put on technologies how these molecules can be produced more easily and efficiently.

How does your research focus inform the above developments?

I am particularly excited about our scientific focus to efficiently turn native antibodies 'off-the-shelf' into site-specifically defined ADCs within 2 days, without the need of any antibody engineering efforts. Our technology thus enables to efficiently turn bispecific and native antibodies into ADCs at a large scale. Furthermore, we are also very interested to develop ADC technologies with an improved cellular uptake and drug delivery respectively can be achieved. To us, combining ADC technology with bispecificity is a very fascinating approach that moves the ADC-field ahead and may enable the development of completely new drugs that have a unique mode of action. We are really looking forward to an exciting time and new technological developments.