



Max-Planck-Innovation

## Technology Transfer

Prof. Dr. Peter Buckel, CEO  
SuppreMol GmbH

### Spin-off: SuppreMol GmbH – Innovation can't be planned

**In the early 1990s it became clear that the future of chemical drug development lay in the synergy of medicinal chemistry, computer science and structure determination. Even for complex biological agents, such as proteins, information on structures was growing in importance. With this in mind, the research departments at Boehringer Mannheim in Penzberg and Mannheim considered setting up their own X-ray structure department. The high cost of investment and the technical expertise that would need to be acquired gave the subject all the hallmarks of a major project. At the time, only a few of the world's top institutes could offer the necessary expertise, and the rapid pace of technological progress in the field meant that an isolated industry group would, in all probability, be unable to keep pace with the speed of the relevant advances.**

The Penzberg-based pharmaceutical research team had already had the positive experience of collaborating with a leading structural research laboratory at the Max Planck Institute for Biochemistry in Martinsried (MPIB), in the lab run by Robert Huber, the 1988 Nobel Laureate in Chemistry. Continuing and extending this cooperation was therefore an obvious choice. A working group at the MPIB was set up, funded by Boehringer Mannheim, to share in the knowledge and technological advances to be found in this foremost of academic environments. The Institute benefited from its industry partner's financial involvement in the form of materials and equipment. Thus began many years of fruitful collaboration between the Max Planck Institute and Boehringer Mannheim's research labs, which continued in the wake of Roche's takeover of Boehringer Mannheim.

One of the basic skills of a researcher is the ability not only to work on the projects for which a budget was officially requested and accounted for, but also to cleverly find the means to start other projects that otherwise might have been refused funding or approval. Scientists often put their heart and soul into the latter category of projects and it's no wonder that the statistics support some particularly successful results for such research.

And this seems to have been the case in the Structural Research Department at Martinsried. The Boehringer Mannheim working group at the Max Planck Institute, headed by Richard Engh, did everything it was expected to do to the complete satisfaction of its industry partner. And now and again it proved possible to accommodate or supervise the occasional new issue.

That is just what happened when a post doc from Bielefeld, Peter Sonderrmann, came to the Max Planck Institute with his project: He had specialized in the biochemistry of Fc receptors (FcR) and wanted to work in Huber's lab, where the first crystal structures of antibodies and their fragments, in particular the Fc fragment, which the Fc receptors bind with, had been determined back in the 1970s. Sonderrmann was the first to be able to create in pure form and crystallize the extracellular part of the FcγRIIb through expression in *E. coli*. Uwe Jacob, a member of the Institute's industry working group, was able to measure the crystals with Peter Sonderrmann, and in 2000 the MPIB team was the first working group to publish the structure of an Fc receptor and its complex with the Fc fragment. The paper was published in Nature.

Producing and determining the structure of an ultrapure, soluble Fc receptor (sFcR) and its therapeutic potential as a key element in B-cell-dependent immunoregulation eventually led the group to the idea of founding a company. Uwe Jacob, Peter Sonderrmann and Robert Huber successfully implemented the plan, registering SuppreMol GmbH in 2002. The Max Planck Society and the inventors had previously ensured that the fundamental results of their

research at the MPIB were patent protected. In the foundation and financing phase, the Max Planck Society's technology transfer organization, Max Planck Innovation GmbH, gave the team of founders intensive support and advice. The company's objective was to evaluate the potential of Fc receptors for pioneering therapeutic strategies.

Cooperative projects with academic experts in Uppsala, Hanover and Munich enabled the team to demonstrate in the primary animal models that the use of sFcγRIIb can suppress autoimmune reactions. These animal models reflect diseases like rheumatoid arthritis (RA), systemic lupus (SLE), multiple sclerosis (MS) and idiopathic thrombocytopenic purpura (ITP). This proof-of-principle (PoP) in animals enabled the firm to raise its first risk capital. An investor from Italy (Z-Cube), put in touch with the firm by Max Planck Innovation, was prepared to give the company a stand-alone structure, first with a convertible bond (2005) and then, in the initial round of financing (the A round, 2006) to convert the bond into equity with additional investors (KfW and Bayern Kapital). Thus, with the first EUR 4 million in place, the team was able to develop a method of producing the sFcγRIIb and to conduct all of the main preclinical work. In mid-2008, additional financing of almost EUR 16 million (the series B round) was attracted, with the goal of carrying out the clinical development in a first indication (ITP), right up to the proof-of-concept (PoC). The series B round was initiated by MIG AG, Munich, and completed with BioMedInvest, Basle, and Santo Holding, Munich, as co-investors. This financing was the decisive step in getting the product to an important stage in its development.

The soluble FcγRIIb represents a new class of biological agents for the treatment of autoimmune diseases. Unlike the drugs available for these indications to date, this is a substance produced naturally in the body and that has the potential to lessen the over-sensitive immune reaction while simultaneously eliminating the immunocompetent cells responsible for the sustained antibody production that attack the body's own tissue. This has enabled the scientists to describe a curative effect for the first time ever, an effect that is not present in the symptomatic treatments available thus far.

Innovation occurs when the knowledge obtained from research finds practical application. Turning this scenario into reality takes a great deal of technology transfer programs by governments, universities, institutes and companies. The only problem is, innovation is fairly impossible to plan. This is borne out by the low success rates of global pharmaceutical research. New blockbuster drugs rarely come about because of targeted research. Usually, someone somewhere makes a scientific discovery and stumbles upon somebody who is turning it into a success. That's why it's important to cluster expertise and to put any inventions identified as promising into a suitable industrial environment. Innovation usually happens in places where cutting-edge research converges with professional, industrial users. In other words, innovation is hard to plan, but it is possible to create the right conditions for it to happen.

The establishment of an industry working group in one of the Max Planck Society's departments was a rather controversial subject at the time. And it wasn't easy to shape a contract around each side's vision of its own role, either. But the will of the parties involved in the project ultimately made it possible for agreement to be reached. The concept has indeed achieved something great by making people more aware of the application potential inherent in academic research. The particularly strong focus on application in the academic setting of the MPIB also played an important role when it came to thinking about developing a product based on the determination of the soluble Fcγ receptor's structure. What matters is that things didn't get trapped in the thinking phase: one member of the group, Uwe Jacob, was tenacious in driving the planning and development of what were sometimes difficult phases in SuppreMol's early history, which he achieved with the professional support of Ulrich Mahr from Max Planck Innovation.

It is still not known whether the early development project will produce an innovation. There are still numerous hurdles to be overcome and a lot more work to be done to deliver an innovative and successful drug. For as we know, innovation just can't be planned!

**Contact:**

Prof. Dr. Peter Buckel  
Chief Executive Officer  
SuppreMol GmbH

Am Klopferspitz 19  
 82152 Martinsried/München  
 Germany  
 Phone: +49-(0)89-309050 68-13  
[www.suppremol.com](http://www.suppremol.com)  
 eMail

Prof. Dr. Robert Huber  
 Max-Planck-Institut für Biochemie  
 Am Klopferspitz 18 a  
 82152 Martinsried/München  
 Germany  
 Phone: +49-(0)89-8578 2678  
[www.biochem.mpg.de/xray/](http://www.biochem.mpg.de/xray/)  
 eMail

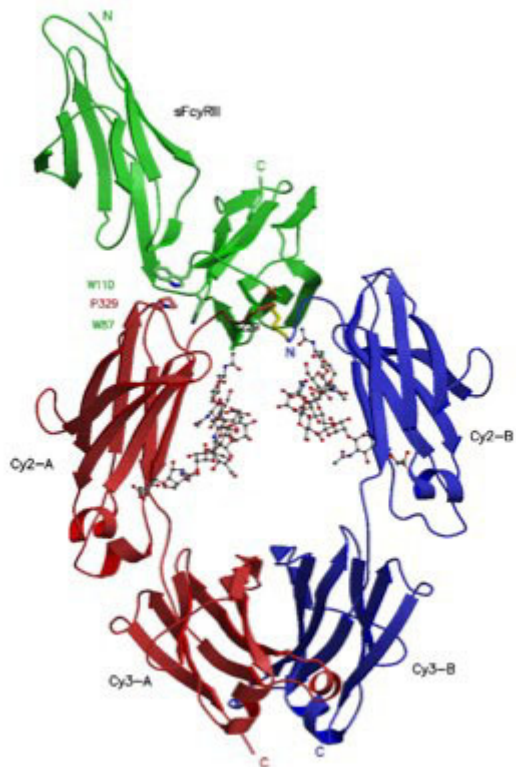


Fig. 1: Binding of the soluble Fc receptor to the Fc region of an IgG antibody

#### Further reading:

- Huber, R., Deisenhofer, J., Colman, P.M., Matsushima, M., and Palm, W. (1976)  
 Crystallographic structure studies of an IgG molecule and an Fc fragment  
 Nature 264, 415-420
- Sonderrmann, P. Huber, R., Oosthuizen, V. and Jacob, U. (2000)  
 The 3.2 Å crystal structure of the human IgG1-Fc fragment -FcγRIII complex  
 Nature 406, 267-273

[Back to overview](#)