

Multiple Aspects of R&D Must Be Optimized to Foster Innovation

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Abstract: On October 27, 2004, Prof. Dr. Daniel Gygax received the annual award for R&D of the Canton Baselland. This important prize was presented to Daniel Gygax by the minister for education of the canton Baselland, Mr. Urs Wüthrich-Pelloli. In his address the executive politician highlighted the exemplary role that Daniel Gygax plays in facilitating technology transfer between academia and industry in biotechnology. This is therefore a good reason and a good opportunity to have a closer look both at what biotechnological competences Daniel Gygax has built up at the Chemistry Department of the University of Applied Sciences in Muttenz (FHBB) and at how R&D of Swiss Universities of Applied Sciences can help foster innovation today.

Keywords: Education · Innovation · R&D award of the Canton Baselland 2004 · SwissbioteCHnet · Technology transfer

The Importance of Biotechnology for Switzerland

Biotechnology is a core technology of the 21st century. It promises to generate novel instruments to tackle as yet unmet medical needs and to develop interesting products for multiple purposes in the life sciences. But as with all technological revolutions, inventions do not suffice to build industries. Industrialization and the build-up of a sus-

tained economic development of a Biotech industry need, in addition, an effective technology transfer.

When presenting the R&D award of the Canton Baselland to Prof. Daniel Gygax on October 27, 2004, Mr. Wüthrich did not overlook the fact that Switzerland still has room for improvement in this respect: “For all too long, we thought that it was sufficient to excel in basic research. Then, we believed, innovations would automatically materialize. But basic research on its own is not enough. Inventions are not the same thing as innovations” [1]. Mr. Wüthrich then went on to stress that technology transfer is a much needed element responsible for the value generating transfer of ideas into marketable products. Enabling, promoting and sustaining such a technology transfer is, however, a difficult task. Multiple target conflicts, *e.g.* the wish to analyze scientific questions in detail and the need to bring products onto markets fast, must be reconciled.

Thus, an R&D person must, first of all, be an excellent scientist. He, or she, must recognize and understand inventions and be inspired by their implications. Secondly, he must be an engineer and technologist to be able to determine the necessary complex-

ity of a realization. Thirdly, he must understand the needs of potential customers as a prerequisite to selecting the most profitable project to be implemented. Because Daniel Gygax has excelled in all these roles, in an exemplary and inspiring way, he was awarded the annual award for R&D of the Canton Baselland, along with the sum of 20,000 CHF.

Building-up Competences in Biotechnology

Daniel Gygax has built up biotechnology research at the FHBB in Muttenz near Basel since 1999. This work includes the development of multiple lectures in biotechnology, a prerequisite to repositioning the Chemistry Department strategically, in order to focus on the life sciences. Today Daniel Gygax leads a group of ten researchers. Several of these scientists are employed for specific projects. Small projects, such as feasibility studies, are supported directly by the university. Larger projects are supported by the Swiss Commission for Technology and Innovation (CTI) as well as by private partners. This financial support highlights the value that ex-

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ternal partners place on collaborating with the biotechnological research at the FHBB. Daniel Gygax comments: “As researchers at a university of applied sciences, we develop and test innovative technologies that may later become standard applications in industrial processes. Thus, we are offering knowledge that is not yet present at young start-up companies. These companies can, therefore, access this knowledge in an unproblematic way and test novel ways or means of performing industrial processes or producing applications.”

Research of Biospecific Interactions in Bioanalytics and Diagnostics

The major focus of the biotechnological research of Prof. Gygax's group at the FHBB is biospecific interaction and its use in bioanalytics and diagnostics. For this purpose, Daniel Gygax can rely on a vast experience from his professional background. He was a Ph.D. student of Prof. Dr. Jakob Nüesch, then undertook post-doctoral research at Harvard, and led the division of immune analytics and pharmacokinetics at Novartis in Basel from 1989–1999. Collaborations with Novartis still exist. Today's projects have however extended the network and include important biotechnological companies such as Prionics Ltd., Discovery Partners Ltd. or Bühlmann Laboratories AG. “In our research, we try to facilitate measurements of biospecific interactions at the molecular and cellular level. For this purpose we concentrate on working with commercially available systems, such as two Biacore Instruments”, says Daniel Gygax. This hands-on experience in enabling technologies is in high demand at companies. It so far resulted in over a dozen joint research projects, which include the development and validation of methods for the purity control of serum proteins together with ZLB Bioplasma AG, Berne, and several projects carried out with Prionics Ltd. for measuring interactions between antibodies and prions.

Technology Transfer

The award was given to Daniel Gygax not only for his research activities but also for his role as co-initiator and acting president of the SwissbioteCHnet. This national center of competence in biotechnology is a crystallization point enabling interaction between universities and industry. It coordinates joint activities of the Universities of Applied Sciences to facilitate the development of R&D projects with industry. The importance Prof. Gygax gives the strength-



Fig. 1. Analysis of proteins for ZLB Bioplasma, AG using a Lab-on-a-Chip System. Performing R&D with commercially available technologies, as performed in the group of Prof. Gygax at the Dept. of Chemistry at the FHBB, facilitates quality management and a seamless integration of results with the industrial partner.

ening of the technology transfer process is also evident from the following: he was an active partner in implementing a program between the Basel University and the FHBB destined to facilitate integrated product development.

That the project oriented R&D done at the Chemistry Department of the FHBB

indeed fosters technology transfer in also shown by the following aspect. Dr. Eric Kübler, a former head of antibody development at Prionics AG, is currently working as an independent project leader at the FHBB in the group of Daniel Gygax. There he is collaborating with Myovec AG on a CTI-project on the diagnosis of certain



Fig. 2. The National Center of Competence in Biotechnology, the SwissbioteCHnet, enables and coordinates the collaboration between Universities of Applied Sciences, academia and industry. A team of Prof. Gygax collaborates with Prionics AG on the biospecific measurement of binding constants of new monoclonal antibodies against prions. The picture shows the team at Prionics AG with Prof. Dr. Daniel Gygax in the center.

muscle diseases. Dr. Kübler comments: “The University of Applied Sciences is a place where I can perform important pre-examinations, followed by early and middle stage developments. In addition, I can also benefit from academic research knowledge that helps to accelerate the product development and shortens the time to a profitable molecular diagnostic tool”.

Education

Education in applied research and development means that theoretical facts must be gauged by real life. In other words, practical experience gives young biotechnologists competitive advantages. Consequently, Daniel Gygax places emphasis on the fact that students can perform the practical work of their thesis at companies. He has even built up a post-graduate fellowship program for excellent alumni of the FHBB. This has enabled graduates such as Bénédict Bart and Reto Ossola to gain in-depth experience at the Institute for System Biology in Seattle, USA.

A Model for Effective R&D?

A critical, sometimes overlooked, success factor in the realization of innovation and hence economic success is the following: people highly educated and skilled in an emerging technology must hold important positions in institutions and companies. Such persons are important multipliers in the transfer and diffusion of novel technolo-



Fig. 3. Award winning R&D. Prof. Dr. Daniel Gygax (on the left) receives the R&D award of the canton Baselland 2004. It was presented to him by Mr. Urs Wüthrich-Pelloli (on the right), the minister for education of the canton Baselland along with a check for 20'000 CHF.

gies into economy and society. In the case of biotechnology, they act as advocates to help innovative biotechnological products to become standardized products widely used to simplify our daily life. Universities of Applied Sciences, besides performing research, thus continue to have the important task of breeding engineers, in this case biotechnologists. In addition, and at the same time, they must enable and promote interactions between academia and industry if they want to innovate.

To quote Minister Wüthrich on this topic for a last time: “As excellent researcher and

developer, Prof. Gygax acts as interface and facilitator between science and market. And he has done it in an exemplary way which invites others to copy it. That is why Prof. Gygax has been awarded the R&D award 2004 of the Canton Baselland.”

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[1] Award Address of Mr. Urs Wüthrich-Pelloli on Oct. 27th, 2004 during the presentation ceremony of the award for R&D of the Canton Baselland 2004 at Sissach.