

Laudatio for Hermann Bujard

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The rapid development of molecular biology has undoubtedly transformed biology into a leading science in recent decades. The molecular bases of life have now become an indispensable part of all the sub-disciplines of biology and are used, for example, in personalised medicine and biotechnology – also now frequently known as synthetic biology – which affects or will affect all our lives. It has actually only been about 50 years since the first fundamental discoveries in molecular biology came into the public spotlight: in 1962 Watson, Crick and Wilkins received the Nobel Prize for discovering the double helix structure of DNA. Shortly before, Jacob & Monod had for the first time described the molecular regulation of genes using the Operon model, for which they also received the Nobel Prize a few years later.

It was precisely against this background that today's award-winner, Hermann Bujard, studied in Freiburg and Göttingen and, in 1962, gained his doctorate in organic chemistry under Prof. Brockmann at the University of Göttingen. The young and wide-open molecular biology was now the subject of the hour and so in 1964 we find him becoming a young postdoctoral fellow at the University of Madison (Wisconsin) under Charles Heidelberger and Gobind Khorana, who jointly discovered the genetic code and who was the first to chemically synthesise DNA oligonucleotides. Just two years later, Hermann Bujard became an Assistant Professor at the Southwest Center for Advanced Studies in Dallas (Texas). In 1970 – at the age of just 36 – he was appointed Professor for Molecular Genetics at the University of Heidelberg.

During his American years, he had finally found his field of research, namely the question of how genes are turned on and off, how the control regions before these genes – the so-called promoters – look like and function at the molecular level, and which switch proteins bind there and transcribe the genetic information lying in the DNA into RNA. It quickly became clear to him that these genetic switches could also be used to produce foreign proteins in bacteria, and the first 'expression vectors' were developed in his laboratory – in fact we still use these systems today without realising that they originate from Hermann Bujard.

Modern biotechnology was therefore born – medically effective proteins (for example insulin or interferon) could now be produced in bacteria. It is therefore no surprise that in 1983 the

Hoffmann-La Roche company brought Hermann Bujard – as one of the pioneers of this new technology – to Basel to become director of its biological research. There he developed a large genetic engineering centre and worked on cancer and neurodegenerative diseases. Using molecular biological and immunological techniques, he also began investigating the surface antigens of the malaria parasite *Plasmodium falciparum*, with the initially distant aim of developing a vaccine against this pathogen.

In 1986 he returned to the University of Heidelberg, this time as Director of the still new Centre for Molecular Biology, called ZMBH for short. Under his leadership the ZMBH developed a highly modern scientific programme, a department structure with flat hierarchies and relatively small, but efficiently working research groups, effective support for young scientists and a corresponding molecular biology teaching programme. In addition, following German reunification he was also involved in assessing and realigning research institutes in the federal states from the former East Germany.

His scientific research continued in two directions. Firstly he developed a gene switch based on the Tet repressor – i.e. on a bacterial regulatory protein – which, by simply administering the antibiotic Doxycycline, makes it possible to continuously regulate genes over a wide range, including and particularly in higher organisms. Parallel to this he also pursued his investigations concerned with developing a malaria vaccine and is still continuing this work today, although he has been officially in retirement since 1999.

But Hermann Bujard is not the type to just sit back and take things easy and so, from 2007 to 2009, he also took over the post as Executive Director of the European Molecular Biology Organisation, or EMBO for short. This is an international association for promoting the molecular biosciences. With 27 member countries, it is at the same time a kind of academy and network for the most distinguished molecular biologists in Europe. Under his leadership, the EMBO Annual Meeting was established as a platform for scientific exchange among thousands of participants, as was the high-calibre journal *EMBO Molecular Medicine*.

When all of his many, diverse activities are viewed as a whole, however, Hermann Bujard has always been first and foremost a dedicated researcher and university teacher. His work has provided fundamental insights into the regulation of genes – and at the same time he has given the scientific community a great tool with the Tet repressor-based gene switch, which he has continually further developed so that today it can even be used to precisely switch on or off specific genes in specific cell types in living organisms. These gene switches have not only become a standard tool in basic genetic and cellular biological research, they

are also used worldwide in the development of new medicines. Along his two publications in PNAS and Science, in which Hermann Bujard introduced the system in the 1990s, have been cited more than 5,000 times, and today there are already more than 10,000 published studies in which the Tet system has been used. After years of research in the laboratory and adventures in Africa and South America, his project to develop a malaria vaccine is also so-to-speak 'on the final straight', and is now entering the clinical testing phase. And finally he has set new benchmarks as a science administrator, in particular in developing the ZMBH's scientific programme and structure, which was at that time completely innovative in Germany. These were both highly successful and have since been copied many times.

The perhaps most striking aspect of Hermann Bujard's academic life is that he never had just the scientific subject in mind but also always the scientific community and society as a whole, as the beneficiary of his work. This is also exemplified by the series of very different awards and honours that he has received – whereby I would just like to mention by way of example the Beckurts Award (1995) that honours basic scientists whose outstanding research has high application potential, or the Medal of Merit of the State of Baden-Württemberg (2005).

Let me conclude by briefly referring to the personal side of Hermann Bujard. I met him for the first time about 30 years ago – if I remember rightly this was part of a German Research Foundation assessment at the University of Konstanz where I received my doctorate at that time. We, as young scientists, naturally had a healthy respect for him as the appraiser. He turned out, however, to be highly interested, incredibly open, enthusiastic and also very likeable – today's younger generation of scientists would probably describe this as 'cool'. Over the years in which I met Hermann Bujard time and again at conferences or assessments, this initial impression was confirmed and deepened. In addition to his scientific achievements, his commitment to the scientific community and, furthermore, his dislike of rigid hierarchies, it is also his personality that has made Hermann Bujard a shining example for my generation of scientists.

Finally, he seems to have discovered something that we all would like to know how it works – he seems unmarked by the passing of time. Since I first met Hermann Bujard, he has looked exactly the same as he looks now sitting amongst us here. But I believe the recipe is simple: it is his unflagging curiosity and enthusiasm for making scientific discoveries, his intellectual versatility and his openness when meeting people.

Dear Mr Bujard, we congratulate you most cordially for winning the Robert Koch Gold Medal, which honours your entire life's work!