

Healthcare industry BW

Gundram Jung – a pioneer in antibody-mediated cancer immunotherapy

Physicist, medical doctor, researcher and now also a founder of a company – Professor Dr. Gundram Jung’s career has never gone in a completely straight line although his goal has always been the same: to develop innovative immunotherapies for the treatment of cancer. Jung’s genetically modified antitumour antibodies are now close to clinical application.



Professor Dr. med. Gundram Jung's original idea was to become a physicist and "understand the universe," he said, smiling. To help finance his science studies, Jung worked as a healthcare assistant in a hospital where he became interested in medical issues. He was particularly fascinated by the capability of the human immune system to effectively recognise pathogens and cancer cells. His growing interest in medical issues took him to the Institute of Biophysics at the University of Münster to do his degree thesis on the interactions of a toxic antitumour protein with DNA rather than on something related to astrophysics.

"When I did my degree thesis, my colleagues and I already considered coupling this protein to a monoclonal antibody," said Jung recalling that "this led us to what we believe was the first immunotoxin to be produced in Germany." In the early 1980s, the coupling of a toxin to an antibody that is directed against specific tumour antigens was an emerging field of science, which was believed to be very promising for the treatment of different tumours. Although there has not yet been a major medical breakthrough with immunotoxins, the virtually endless therapeutic potential of monoclonal antibodies has since remained Jung's major research topic.

The goal: innovative therapies

His interest in medicine led to Jung taking up medical studies alongside his physics courses, initially in Münster and later in Tübingen. He graduated in physics and medicine and was granted a scholarship by the Mildred Scheel Foundation for Cancer Research, which enabled him to continue his career at the renowned Scripps Research Institute in La Jolla, California in 1984. He spent three years in the institute's Department of Immunology on the therapeutic application of antibodies and was able to co-establish a field of work to which he has been attracted ever since: bispecific antibodies that activate immune cells against tumour cells.

When he returned to Germany, Jung decided to continue his research at the Munich University Medical School (LMU) and become an internal medicine specialist. As medical doctor and researcher, direct contact with patients was extremely important for Jung: working as researcher and medical doctor simultaneously was both a challenge and a positive thing. "Working exclusively in the laboratory would not have suited me," said Jung going on to add "in particular since what I have learnt at the bedside has always contributed to keeping me on track with my original goal of developing innovative immunotherapies for the treatment of cancer."

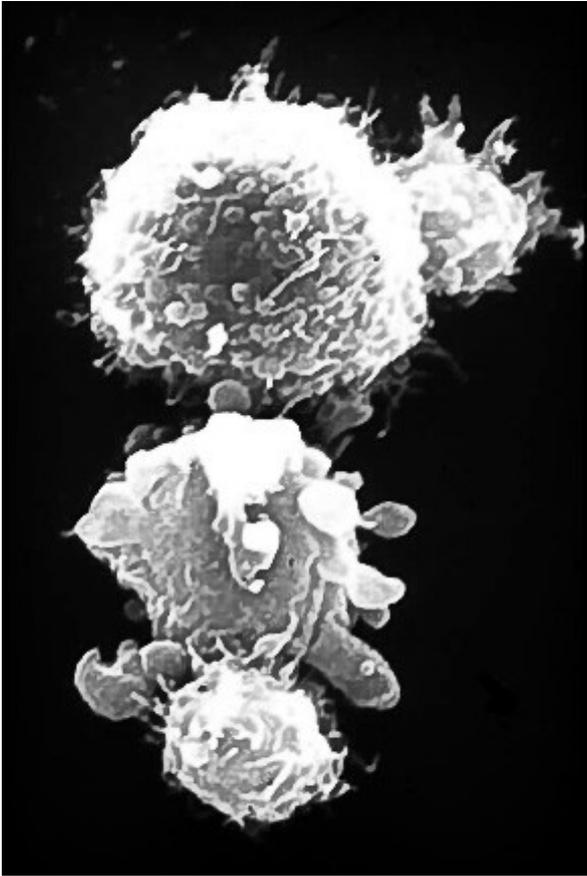
Translational orientation

Jung has been head of the Section of Experimental Antibody Therapy in the Department of Immunology at the University of Tübingen since 2002. "The section is translationally oriented," said Jung who is extremely keen to transfer his excellent basic immunological research to clinical application as quickly as possible. The best example of Jung's current translational research is a genetically modified antibody for the treatment of leukaemia, which he has developed in cooperation with his colleagues Dr. Ludger Große-Hovest and Dr. Steffen Aulwurm. Initial clinical results obtained with the antibody, which reacts to certain surface properties of leukaemia cells and makes them visible for the human immune system, are rather promising. "We have been able to show that the antibody is able to keep cancer cells at bay for a certain period of time," said Jung.

The immunologists from Tübingen believe that the antibody has the potential to halve the number of

relapses that occur after a chemotherapeutically induced remission. They are planning to commence a larger clinical study in early 2012. "We are rather proud of the fact that we have been able to take this antitumour antibody from the laboratory to clinical application in such a short time," said Jung.

Promising portfolio



Bispecific antibodies induce the lysis of tumour cells by way of activated T-cells
© Gundram Jung & John Chiu

As the project is funded as part of the GO-Bio programme of the German Federal Ministry of Education and Research (BMBF) which foresees the establishment of a start-up company in the second funding phase, Jung will soon be a scientist and doctor who also has his own company. "I think in some ways that this has all gone a bit too fast," admitted Jung frankly, going on to add "I would have liked to continue the project for another three years or so at university, for example until we had finished the first larger clinical study." However, Jung is very much aware of the financial constraints academic research faces. "With the budget our institute has available, we would not be able to cover the high costs associated with the production of antibodies for such a large number of patients. We have no choice but to take external investors on board," said Jung.

Jung's start-up company Synimmune GmbH, which has an interesting product candidate portfolio, has already been able to attract several investors. Jung and his colleagues already have another antibody product in the pipeline. The company's bispecific antibodies, which are in some ways Jung's "first love", have the potential to become a new milestone on the road towards the development of new cancer therapies. Jung's bispecific antibodies not only bind to tumour cells, but also activate the T-cells of the human immune system. This is something monospecific antibodies are incapable of doing. "T-cells are the most important and most potent cells of the specific immune system; they specifically react with cancer cells," said Jung explaining that his group of researchers hopes that their bispecific antibody strategy will improve the body's own immune defence against the tumour.

Bispecific antibodies – beacons of hope

“We expect the bispecific antibodies to be considerably more effective than monospecific antibodies,” said Jung. On the other hand, he also assumes that the bispecific antibodies’ mechanism of action will be associated with more adverse effects and risks. “Great care needs to be taken not to activate too large a number of T-cells,” said Jung. Before the antibodies are ready for application in human patients, the researchers need to carry out further experiments. “However, we hope that this will only take around three years instead of the seven to ten years that was previously necessary,” said the scientist.

Despite the promising results achieved so far, Jung anticipates that antibody therapies on their own will not be able to completely cure cancers. “Research in the future will therefore also have to concentrate on the pursuit of other innovative approaches, including vaccination with tumour-associated peptides,” said the researcher, going on to add “only the combination of several different immunotherapies will bring about decisive breakthroughs.” In order for Jung and his team to reach the sought-after breakthrough, Jung has joined forces with Professor Dr. Hans-Georg Rammensee in Tübingen and established the Centre for Translational Immunology (TransLimm). This network brings together basic researchers, doctors at the University Hospital of Tübingen and regional biotechnology companies. “We hope that the direct exchange of information between all players involved will provide us with new ideas on completely new therapeutic principles,” said Jung who knows very well from his work as hospital doctor that the most creative basic research ideas often arise from bedside observations.

Further information:

Prof. Dr. Gundram Jung
University of Tübingen
Department of Immunology
Section of Experimental Antibody Therapy
Auf der Morgenstelle 15
D-72076 Tübingen
Tel.: +49 (0)7071/ 29 - 87 621
Fax: +49 (0)7071/ 29 - 5653
E-mail: [gundram.jung\(at\)uni-tuebingen.de](mailto:gundram.jung@uni-tuebingen.de)

Article

19-Dec-2011
sb (15.11.11)
BioRegio STERN
© BIOPRO Baden-Württemberg GmbH

EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN

