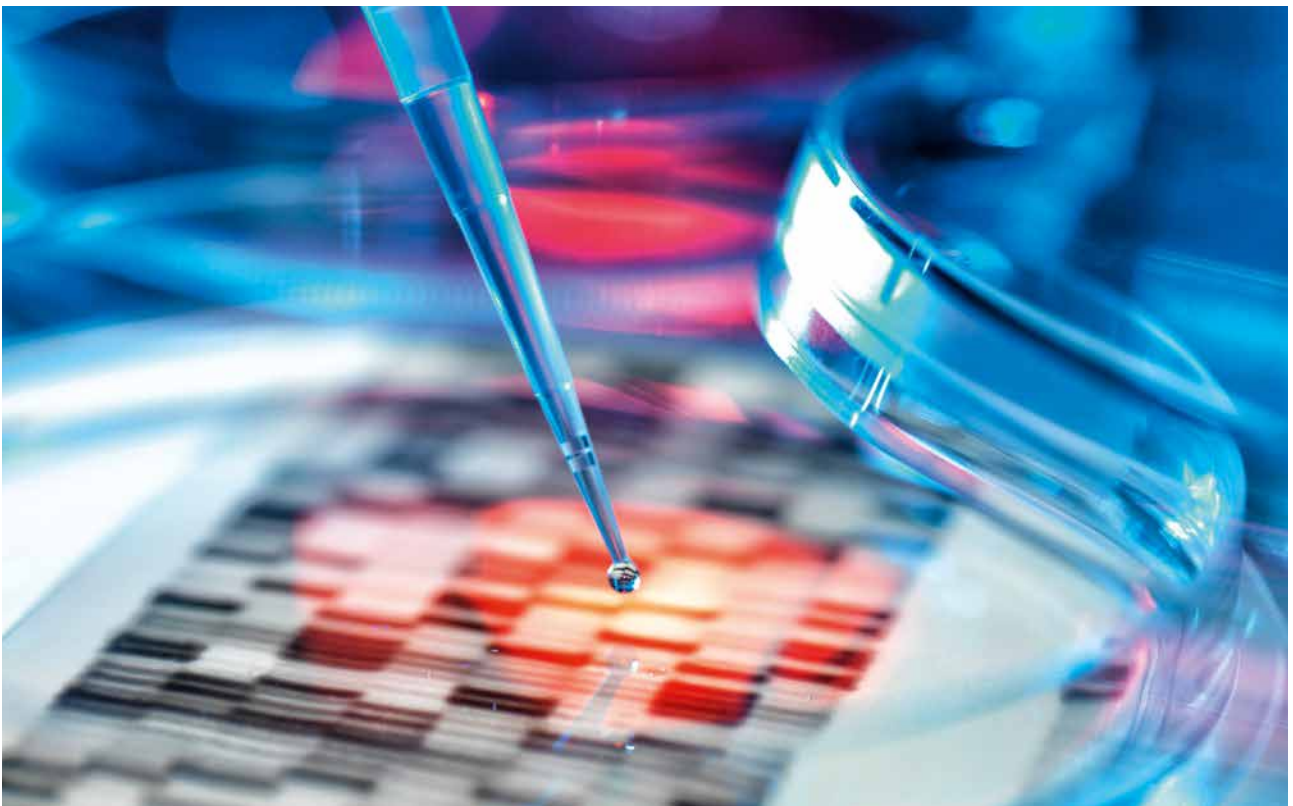


The secret of the gene switch

Scientists around the world are conducting research into the functions of key proteins in our DNA. These epigenetic processes act like an overriding genetic code, and may trigger diseases such as cancer. Bayer has joined the Structural Genomics Consortium (SGC) to support epigenetics research together with universities and other partners from the industry. The goal of the public-private partnership is to make it possible to get innovative drugs to treat cancer and other disorders to the patients faster.



Code of life: not only our genes determine who we are. Epigenetic mechanisms decide whether these genes are active or inactive.

They work around the clock, in every cell in the body: our genes regulate every vital process and are themselves in turn regulated by tiny, molecular switches. But not every gene is active all the time. Using a complex molecular process, the nucleus regulates when and to what extent each gene is switched on or off. The mechanism for this involves tiny molecular markings that are attached, read and then removed again. These epigenetic mechanisms can also contribute to the development of diseases such as cancer. Important growth inhibitors in the DNA of tumor cells are often deactivated, allowing the diseased cells to proliferate uncontrollably. Researchers suspect that these molecular switches

could also play a role in asthma and diabetes mellitus. "We want to better understand the epigenetic processes underlying certain diseases, so that we can come up with new approaches for active substance research," explains Dr. Anke Müller-Fahrnow, Head of Lead Discovery at Bayer HealthCare in Berlin. To allow Müller-Fahrnow and her research colleagues to be even more successful in this regard, Bayer has joined the Structural Genomics Consortium (SGC), an international, not-for-profit organization that promotes networking between currently more than 200 research groups from academic research and eight pharmaceutical companies. Their objective is to research the mechanism of action



Working towards a goal together: Dr. Marion Hitchcock, Dr. Ursula Egner and Dr. Anke Müller-Fahrnow (left to right) are driving forward research sharing with partners and thus also advancing drug development.

and structure of key proteins that couple the epigenetic switches to DNA. The research partners make their findings freely available on the SGC platform.

"We're providing financial support for the organization and have contributed actively to four joint collaboration projects with research in our laboratories since December 2013," explains Dr. Marion Hitchcock, Alliance Manager at Bayer HealthCare. "Since March 2015, we have broadened the scope of the alliance and are also collaborating with the SGC in a project sponsored by the Innovative Medicines Initiative (IMI), a public-private partner-

ship launched in the European Union." Together with other partners, the scientists are conducting research into new approaches to develop active substances for inflammatory processes.

Academic research and the pharmaceuticals industry work hand in hand in the consortium

The SGC collaborations are all about sharing: the partners decide together which proteins the consortium will work on. "Each research group contributed its own experiences, so we were able to choose the most promising proteins right from the word go," says Hitchcock. The partners provide substances such as chemical probes: tiny molecules which can be used to study the function of a protein in the organism. The advantage: "Having access to the academic network of the SGC means that we can have broad-based research into the biological function of a protein earlier. It saves time and money," says Hitchcock.

The SGC does not patent its findings but rather makes them available to the general public as quickly as possible. "The SGC is promoting advancement and dialog among scientists," explains Dr. Ursula Egner, Head of Structural Biology at Bayer HealthCare. As a result, new approaches from epigenetics research will in future be put into practice in drug development much faster. "The publication of research findings ultimately benefits the patients most of all," says Egner.



www.research.bayer.com/epigenetics

More information on this subject

Molecular switchboard

Tiny markings on our DNA define which genes are active or inactive. These epigenetic mechanisms cause a gene to be mechanically readable and thus active or not.

