Healthcare industry BW

Genome research as information research

DNA sequencing has become indispensable in modern science. Innovative advances that will bring about changes in the life sciences and medicine are due to rapid developments in genome analysis technologies. These technologies are increasingly being used in human diagnostics where they have made it possible to diagnose rare genetic diseases and analyse cancers. In the interview below, Peter Pohl, CEO and co-founder of GATC Biotech AG, explains why DNA sequencing will become even more important in future.

Mr Pohl, where is DNA sequencing used and why is it so important for the field of medicine?

"We work in a highly innovative industry where nobody knows from one day to the next what is going to happen. That's what I like about it." Peter Pohl – CEO and co-founder of GATC.
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Modern medicine is currently shifting from being an empirical medical skill of healing to a rational molecular science. Molecular analysis methods such as genome sequencing provide a more accurate scientific understanding of the causes and progression of diseases. Measurable indicators of a particular condition or state, so-called biomarkers, are increasingly being taken into account in treatment protocols.

Progress and the increasing application of DNA and RNA sequencing methods mean that genome analyses are becoming much more common in clinical practice. Genetic features and disease causes can be better identified at a much earlier stage than before, and this information can then be used to improve disease prevention and therapy.

Over the past few years, research has been focused on the decoding of genetic information, and now genomic research is undergoing a paradigm shift from basic research to clinical practice. Personalised cancer diagnostics that can be used to characterise the specific type and stage of cancer of individual patients and monitor the therapeutic process is an excellent example of this paradigm shift.

Why is it so important to continue developing next-generation sequencing? What do you see as future areas of application?

The application potential of genetic information is huge. The deciphering of genetic information stored in DNA and RNA enables researchers to identify and use the information content of evolution. Genome research is therefore information research, which makes it a key technology for all scientific research. Genome analysis methods form the basis of further innovative developments in the life sciences and molecular diagnostics in particular. They can also be used to optimise industrial processes used for drug and food production, and decipher the molecular basis of cellular processes and their regulation.

Sequencing and other genome analysis methods have diverse areas of application, ranging from exome sequencing to transcriptome research and epigenetics. The latter is the study of the molecular mechanisms that introduce changes to the genome without altering the underlying nucleotide sequence.

The dynamic alterations in the transcriptional potential of cells are now extremely important as research has shown that epigenetic changes are responsible for human diseases and alterations in personality traits.

GATC Biotech is constantly adopting new technologies and developing innovative products based on state-of-the-art science and market requirements. What are your latest products?

Logistics, standardisation, parallelisation of process workflows and a specific laboratory information management system (LIMS) enable rapid processing of samples.
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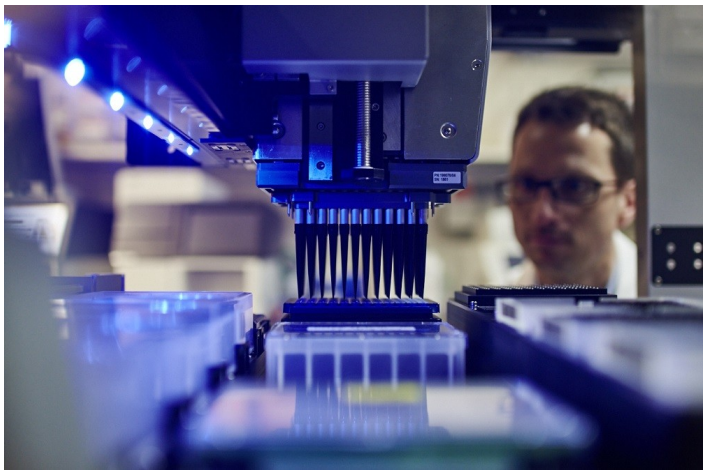
Innovation is a top priority in GATC Biotech's product development. We have recently come up with two new products for analysing PCR fragments up to 3,000 base pairs long. These products enable the cost-efficient high-throughput sequencing of specific target regions in complex genomes.

The methods' unprecedented flexibility in terms of sequence length now allows an unbiased characterisation of neighbouring SNPs (single nucleotide polymorphisms), regulatory sequences in untranslated regions as well as features of regions that short reads cannot fully span. The major advantage of this is that the majority of genes can be sequenced in their entirety, and neighbouring areas that might have an impact on the translation of the relevant genes can also be sequenced. As several regions can be covered by a single read, these new methods can also be used to identify and quantify co-variants.

One of the company's new services, called INVIEW AMPLICON Ultra-long, was designed for use in CRISPR genome editing or human leukocyte antigen (HLA) typing. INVIEW AMPLICON Ultra-deep was designed for the analysis of shorter fragments of up to 570 base pairs and is perfect for identifying rare mutations in complex and heterogeneous samples.

What is the target group of these new products and where will they be used?



ISO 17025 accreditation recognises high quality and reliability in the field of diagnostics.
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Clearly defining target groups is quite difficult. The borders are relatively blurry as our products address both physicians in the fields of human genetics and translational medicine as well as industrial and academic researchers who use them for a broad range of different projects.

In the medical field, the sequencing of PCR fragments is used for detecting rare genetic variances that occur, for example, in genetic diseases. It is also an effective method for the taxonomic profiling of microbial communities using 16S rRNA. Applications of the method range from the optimisation of food, cosmetic products and animal feed additives to the analysis of environmental samples.

What kind of developments can we expect from GATC in the future?

Other objectives are to accelerate medical research, linking phenotypic features with the underlying genes and identifying cancer-related gene variants. DNA and RNA sequencing is already being used for diagnostic applications, biomarker ID and drug development. Nevertheless, the technology is only just beginning to reveal its full potential.

At present, our entrepreneurial energy is focused on an entirely new approach in the field of personalised medicine. We are offering scientists access to our novel GATCLIQUID Technology Suite in an early access programme aimed at jointly developing new diagnostic cancer tests. GATCLIQUID is based on a method used for diagnosing blood cancers (liquid biopsies). We will use the technology to develop products that we hope will transform cancer from a deadly disease into a chronic one. We are convinced that GATCLIQUID will become the "X-ray of the 21st century".