

## **Peptide Chips for Improved Cancer Diagnostics**

**Synthetically produced short protein fragments, or peptides, are an important tool for researchers and medics. However, peptide production is expensive and time consuming. Scientists at the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) have now succeeded in generating peptides on a microchip – a method that is faster and, thus, less costly than previous ones.**

Synthetic peptides are indispensable for numerous biochemical and diagnostic detection processes such as detecting antibodies that enable scientists to diagnose diseases. Dr. Volker Stadler, Associate Professor Dr. Ralf Bischoff and Associate Professor Dr. Frank Breitling have developed a novel technique to generate peptides directly on a microchip. The method is very efficient: While conventional peptide chips yield a density of 22 peptides per square centimeter, the DKFZ microchip delivers 40,000 different peptides per square centimeter.

If magnified many times, the microchip looks like a giant chessboard. The protein fragments are assembled on the squares step by step from their building blocks, the 20 amino acids. It is possible to select a different sequence of these building blocks on each square. At the start, the amino acids are integrated into solid pellets. Electrical fields direct the pellets to the right place on the chip. When matching amino acids lie on every square, the pellets are melted and the amino acids released. Thus, it is possible to add one building block to all 40,000 peptides on the chip at the same time. Other methods need several steps to do this.

Researchers hope that it will be possible one day to produce microchips with several thousand peptides for just a few cents. Using conventional methods, the production of peptides in such large amounts costs several thousand euros. "Our method will facilitate research projects that would simply have been too expensive before," said Ralf Bischoff.

Potential applications of this method include medical diagnostics. The peptide chips are capable of detecting antibodies in patient blood that help to determine the disease. The microchips can also be applied to selectively search for peptides that may be used in cancer treatment or may be potential candidates for vaccines against infections.

Mario Beyer, Alexander Nesterov, Ines Block, Kai König, Thomas Felgenhauer, Simon Fernandez, Klaus Leibe, Gloria Torralba, Michael Hausmann, Ulrich Trunk, Volker Lindenstruth, Ralf Bischoff, Volker Stadler, Frank Breitling: Combinatorial Synthesis of Peptide Arrays onto a Microchip. *Science* volume 318 no. 5858, page 1888. DOI: 10.1126/science.1149751

The task of the Deutsches Krebsforschungszentrum in Heidelberg (German Cancer Research Center, DKFZ) is to systematically investigate the mechanisms of cancer development and to identify cancer risk factors. The results of this basic research are expected to lead to new approaches in the prevention, diagnosis and treatment of cancer. The Center is financed to 90 percent by the Federal Ministry of Education and Research and to 10 percent by the State of Baden-Wuerttemberg. It is a member of the Helmholtz Association of National Research Centers (Helmholtz-Gemeinschaft Deutscher Forschungszentren e.V.).

This press release is available at [www.dkfz.de/pressemitteilungen](http://www.dkfz.de/pressemitteilungen)

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