

Chips are down as Manchester makes protein scanning breakthrough

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Scientists at The University of Manchester have developed a new and fast method for making biological 'chips' – technology that could lead to quick testing for serious diseases, fast detection of MRSA infections and rapid discovery of new drugs.

Researchers working at the Manchester Interdisciplinary Biocentre (MIB) and The School of Chemistry have unveiled a new technique for producing functional 'protein chips' in a paper in the *Journal of the American Chemical Society* (JACS), published online today (22 August 2008).

Protein chips – or 'protein arrays' as they are more commonly known – are objects such as slides that have proteins attached to them and allow important scientific data about the behaviour of proteins to be gathered.

Functional protein arrays could give scientists the ability to run tests on tens of thousands of different proteins simultaneously, observing how they interact with cells, other proteins, DNA and drugs.

As proteins can be placed and located precisely on a 'chip', it would be possible to scan large numbers of them at the same time but then isolate the data relating to individual proteins.

These chips would allow large amounts of data to be generated with the minimum use of materials – especially rare proteins that are only available in very small amounts.

The Manchester team of Dr Lu Shin Wong, Dr Jenny Thirlway and Prof Jason Micklefield say the technical challenges of attaching proteins in a reliable way have previously held back the widespread application and development of protein chips.

Existing techniques for attaching proteins often results in them becoming fixed in random orientations, which can cause them to become damaged and inactive.

Current methods also require proteins to be purified first – and this means that creating large and powerful protein arrays would be hugely costly in terms of time, manpower and money.

Now researchers at The University of Manchester say they have found a reliable new way of attaching active proteins to a chip.

Biological chemists have engineered modified proteins with a special tag, which makes the protein attach to a surface in a highly specified way and ensures it remains functional.

The attachment occurs in a single step in just a few hours – unlike with existing techniques – and requires no prior chemical modification of the protein of interest or additional chemical steps.

Prof Jason Micklefield from the School of Chemistry, said: "DNA chips have revolutionised biological and medical science. For many years scientists have tried to develop similar protein chips but technical difficulties associated with attaching large numbers of proteins to surfaces have prevented their widespread application.

"The method we have developed could have profound applications in the diagnosis of disease, screening of new drugs and in the detection of bacteria, pollutants, toxins and other molecules."

Researchers from The University of Manchester are currently working as part of a consortium of several universities on a £3.1 million project which is aiming to develop so-called 'nanoarrays'.

These would be much smaller than existing 'micro arrays' and would allow thousands more protein samples to be placed on a single 'chip', reducing cost and vastly increasing the volume of data that could be simultaneously collected.

Source: University of Manchester

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