New method allows easy separation of membrane proteins

July 25 2016, by Rupesh Paudyal

Scientists have described an improved, cost-efficient method to isolate membrane proteins, a class of proteins that are the targets of more than 60 percent of approved therapeutic drugs.

Studying proteins in detail requires them to be separated from thousands of other proteins and lipids (molecular fats) present in the cell. This purification of proteins is essential to gain structural information, which is used to design target drugs. But purification of membrane proteins has been a major hurdle limiting scientific advances. So pharmacological and medical applications are also being constrained by these limitations.

In order to overcome these limitations, scientists at the University of Leeds and the University of Birmingham have developed a new technology using a polymer called SMA (Styrene maleic acid). This polymer has already been used in ar dashboard plastics and is increasingly used in cosmetics, but its application in scientific and medical fields is new. The main advantage of SMA polymer is that it cuts proteins out in their natural environment, which is essential to maintain the function of the proteins.

The study published in *Nature Protocols*.

Dr Vincent Postis, one of the first authors of this study said, "Our technique uses SMA like a 'cookie cutter' to extract membrane proteins in its fully folded state held together by surrounding membrane lipids. It allows researchers to study the protein readily following isolation. This

method enables the purification of range of membrane proteins, from small to very large, that was for many years deemed almost impossible by many scientists."

Purifying proteins in a naturally folded state offers insights into the 3D details of the protein structure. Knowing the detailed shape of the proteins is essential for targeted drug design, just like designing a key to fit the lock.

Currently, scientists try many different target drugs to find the target protein. But with this new technique, they can understand the shape of the keyhole (meaning the 3D structure of the target protein) and then design the key (the target drug) that fits.

This new technique may prove to be particularly important with the current emergence of antibiotic resistant 'superbugs.' Increased antibiotic resistance has prompted the identification of new and efficient drugs. This new method has the potential to enable scientists to carry out research to do exactly that.

More information: The full article is titled: A method for detergent-free isolation of membrane proteins in their local lipid environment. www.nature.com/nprot/journal/v … /nprot.2016.070.html

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