Major step for drug discovery and diagnostics

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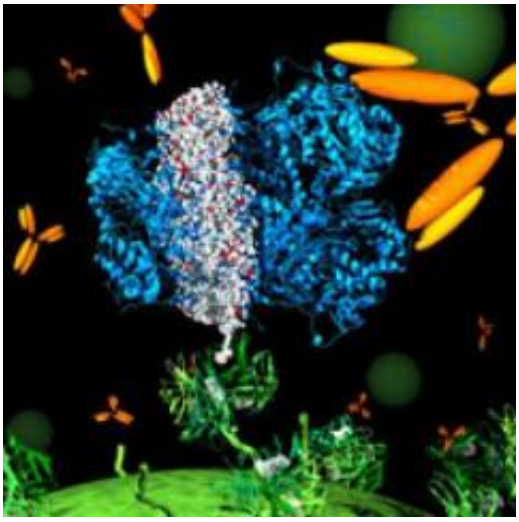

This is an antibody recognizing a membrane protein dressed in an amphipol attached to a solid surface. Credit: Delphine Charvolin

Researchers from Nano-Science Center, University of Copenhagen and National Centre for Scientific Research, France have developed a general method to study membrane proteins. This method can be used to screen several thousand proteins, and it will reduce the way from development to useful drugs substantially. Already now the pharmaceutical industry is interested and participate in a European consortium that is under construction. The research results are published in the prestigious scientific journal, *PNAS*.

Membrane proteins are located at the surface of cells and they have a very important role in the communication between the cells in our body. Defective membrane proteins are involved in diseases such as cancer, cardiovascular diseases and neurological diseases, just to mention at few. The researchers have developed a system, where they tie a tag to the protein that attach it to a surface and make it possible to investigate it in the laboratories.

Until now membrane proteins have been difficult to study when they are away from their natural environment in the cell, where there a belt of lipids surrounds them. This belt is essential for their survival and proper function.

Swimsuits for proteins with a tag

"With our new method we can study membrane proteins faster and more accurate using less material than before. We are using a kind of swimsuit for the proteins called amphipols. The amphipol substitute for the lipids, surround the membrane protein, and make it soluble in water while keeping its function intact. We attach a tag to the amphipol that will assemble to a surface like a key-lock system. When we have attached the proteins to a surface they can be adapted to several measuring instruments," says Associated Professor Karen Martinez, Department of Neuroscience and Pharmacology and Nano-Science Center at University of Copenhagen.

The researchers have tested their method on several different proteins and the results are very promising. When looking for new drugs, the researchers wants to study the interaction between membrane proteins and other molecules - e.g. potential drugs. It can also be used for the detection of virus, bacteria and parasites. A European consortium that is currently under construction, involving approximately 15 different laboratories, including both private companies and universities, will

exploit the perspectives of this promising method.

"Our results indicate that the function of the tested proteins is not affected by the immobilisation. This makes it a general method that can be used for studying any membrane protein to virtually any surface. Membrane proteins involved in various diseases can be tested and our results can already now be used in the pharmaceutical industry to screen for new drugs and for diagnostics," says Dr. Jean-Luc Popot, head of the group at National Centre for Scientific Research and, in collaboration with R. Audebert and C. Tribet, the inventor of amphipols.

More information: Link to paper in PNAS: www.pnas.org/content/106/2/405 … e9-925f-23c88188862f

Source: University of Copenhagen

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