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Press Release

Putting medication exactly where it needs to be

In €3m EU research network, Tübingen biochemist aims to place bioactive proteins into cell membrane – Potential cancer treatment

Tübingen, 26 February 2014

University of Tübingen biochemist, Professor Dr. Doron Rapaport, is part of a new network researching cell membrane proteins, which the European Union is sponsoring with €3m over four years. The TAMPting network investigates processes in the cell membrane which could be used in new cancer treatments; it includes researchers from Germany, the UK, Italy and the Netherlands, along with companies from Israel, Sweden and Germany. Professor Rapaport's project within the network receives a total of €444,000.

TAMP stands for tail-anchored membrane proteins, which regulate cellular compartments. Cells rely on membranes to create internal micro-environments and to protect them from the outside world. The biological membranes that form these barriers are highly complex and diverse in nature – yet they are generally characterised by a bilayer composed of many different lipids that is studded with many proteins.

Cells must normally replenish and renew their membranes, and a key part of this process is the insertion of new proteins into the lipid bilayer. The insertion of membrane proteins into an existing membrane structure is a complex undertaking that typically relies on several biological processes. A major objective of the network is to understand the molecular mechanisms that underlie the insertion into the lipid bilayer of a particular class of important membrane proteins, the tail-anchored membrane proteins, or TAMPs. These proteins are crucial for the function, dynamics and maintenance of cellular compartments and thus for the cell as a whole.

It is also possible to create artificial, lipid only, membranes; these liposomes can be used by the pharmaceutical industry to optimize drug delivery. Whilst liposomes are comparatively straightforward to make, the incorporation of potentially useful proteins into their membranes has proved more difficult. Professor Rapaport and his team intend to exploit the special characteristics of tail-anchored proteins, combining them with expertise in liposome technology in order to create a simple method for modifying artificial membranes – so that specific, biologically-active proteins can be efficiently incorporated into them. This could lead to new treatments for different types of cancer. TAMPting began in Nov. 2013.

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