SUCCESS STORY

ORGANELL / Organelle Homeostasis: How Are Membrane Fission and Fusion Machineries Coordinated to Regulate Size and Copy Number of a Lysosomal Compartment?
Research area: FP7 – European Research Council / Cellular and Developmental Biology (LS3)

Beneficiary: Prof. Andreas Mayer
Host institution: University of Lausanne (UNIL)
Start date – End date: 2009-09-01 to 2014-08-31
Funding: € 2 310 000
Type of contract: ERC Advanced Grant

ANDREAS MAYER

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"Research offers sublime moments when everything falls into place, when facts come to light – slotting into place with other facts to form a consistent whole."

HOW ORGANELLES MAKE THEIR PLACE INSIDE CELLS

With a passion for experimenting since childhood, and moved by the need to understand, Andreas Mayer investigates neurotransmission within the nervous system of plants and animal species. In 2009 he obtained the European Research Council's (ERC) subsidy to carry through a research on the biogenesis of organelles and the vesicular traffic, called *"Organelle Homeostasis: How Are Membrane Fission and Fusion Machineries Coordinated to Regulate Size and Copy Number of a Lysosomal Compartment?"*.

What made you first realise being a scientist was your vocation?

I always liked making experiments. As a child I received the "little chemist" toy box which kept me very busy! I suppose I had a gift for this. When I finished school I hesitated between engineering, medicine, chemistry and biology but an unsatisfactory training job in engineering made me decide to opt for sciences. I was interested in biochemistry but no specific cursus existed, so one had to make up one's own curriculum, which I did. I very quickly focused on plants and for my thesis I worked on the reconstituting of protein translocation, through the external membrane of mitochondria. That was pretty bold, as a few people had already failed; however I came up with a different approach which proved successful.

What did you discover in this thesis?

Inside cells, membranes separate the proteins. Sometimes, the proteins must pass through these barriers. I wanted to understand the mechanism that permits the proteins to pass into the mitochondria, and into all the organelles. The mechanisms are the same whether it be in mushrooms, plants, mammals and even Man. And I was able to prove that this machinery was reversible. I discovered that the principle of translocation, or how proteins are able to pass through in one direction, then in the other, was that of the Brownian ratchet. This gave me confidence. And today thanks to the subsidy from the ERC, I am able to further my career as a researcher into a new research about organelle homeostasis.

What are the main positive aspects of this subsidy?

It is aimed at innovative, daring projects that don't require a network of formal researchers. A single researcher is granted a subsidy for a period of five years. And the necessary collaborations always take shape spontaneously, without any political pressure.

ABOUT THE PROJECT

Andreas Mayer's research *"Organelle Homeostasis: How Are Membrane Fission and Fusion Machineries Coordinated to Regulate Size and Copy Number of a Lysosomal Compartment?"* aims to understand how the number, size and volume of an organelle in a cell is determined. Each cell contains about ten mitochondria. Why are they of this size, and not another? Is there a way to regulate it, and an internal coordination to guarantee a place for each of these organelles? These phenomena and the molecular processes observed by Andreas Mayer and his team of 13 researchers are the same in plants and in animals. They are from now on a general relevance and concern neurotransmission inside the nervous system, as well as immune defence, hormone secretion and the production of digestive enzymes in the body.

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