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PRESS RELEASE

Nanoparticles to activate neurons

Laura Ballerini's group at SISSA receives more than one million dollars from the Human Frontiers Science Program for a cutting-edge project

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Nanoparticles which thanks to a flash of infrared light are able to release electrical signals or specific active molecules to the nerve cells to which they are attached. This brand new project, coordinated by SISSA professor Laura Ballerini with researcher Denis Scaini, features scientific reflections that embrace a very distant but fascinating range of applications. The proposal, entitled "nFlare: an innovative light approach to study and modulate neuronal activity in vitro and in vivo", has just been awarded more than one million dollars of funding within the scope of the Human Frontiers Science Program, one of the most competitive and prestigious at international level to support research in the field of life sciences. What is about to get underway is a scientifically intriguing project, explains Ballerini, "based on an approach which predicts that a certain number of nanoparticles can attach themselves to the cellular membrane of neurons. Here, with the stimulation of infrared light – which maximally penetrates tissues and for this reason, for our research purposes, is extremely interesting - the nanoparticles can activate or deactivate specific cells, or parts of them, with a targeted action. This is basic research, which can be useful for understanding the most refined mechanisms of neuron operation with a non-invasive approach". To

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speak of the applicative aspects of this technique, explain Ballerini and Scaini, is totally premature: “But, certainly, we can imagine fascinating developments. It could, for example, be exploited to release specific medicinal drugs in specific areas of the nervous system, with a flash of light. Or activate electrical stimulation in a specific brain site without the need for implanting stimulating electrodes or, alternatively, without perturbing the system by genetically altering specific neural circuits, such as the case of optogenetics. Our purpose for the moment is to refine this technique towards an effective and efficient method”.
The professor’s group will coordinate the project, in a panel which also includes the University of Chicago and the University of Cambridge: “It is a result which makes us particularly proud, for several reasons” explain the scientists “It is a call which sees global participation: we arrived sixth out of 61 proposals selected for the final phase, out of more than 600 who took part in the initial phase. The funding is truly significant and the collaborations, which, as leader, we will take forward for this research, are of great scientific importance. In short, it is a very important result for our research group and for SISSA”.

IMAGE
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