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CENTRO DE INVESTIGACION

Seminario CIPF

Optogenetics and Transcription: A Photon of Possibilities

Speaker: Lorena de Mena

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Abstract: Tools that enable manipulation or perturbation of gene function are critical to define its contribution to normal development and disease. Thus, advances in our capacity to design and use novel strategies for controlling gene expression at fine spatial and temporal resolution will be essential for deciphering many cellular, developmental and physiological processes. Unfortunately, current inducible expression systems involve steroid hormones, antibiotics, heavy metals, or heat shock, which can induce toxicity or pleiotropic effects. What if transgene expression could be rapidly activated and immediately reversed with a switch triggered by light? Optogenetics exploits the advantages of photoactivation, which provide speedy response, spatial precision and reversibility. Here, I will address the most recent optogenetic systems designed to control gene transcription in both unicellular and multicellular eukaryotic organisms. I will focus on the advantages and disadvantages of the different tools described in the literature as well as analyze the current and future challenges encountered in their translation to living organisms.

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