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Targeting mithocondrial morphodinamics

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Mitochondria are double membrane organelles essential for energy homeostasis in eukaryotes but also critical for regulating iron and calcium homeostasis, redox regulation, autophagy, innate immunity, and cell death. Several human pathologies including neurological, cardiac, infectious, cancerous, and metabolic diseases have been associated with altered mitochondria morphodynamics. Here, we identify a small organic molecule, which we named Mito-C. Mito-C is targeted to mitochondria and rapidly provokes mitochondrial network fragmentation. Biochemical analyses reveal that Mito-C is a member of a new class of heterocyclic compounds that target the NEET protein family, previously reported to regulate mitochondrial iron and ROS homeostasis. One of the NEET proteins, NAF-1, is identified as an important regulator of mitochondria morphodynamics that facilitates mitochondria fission. The newly identified chemical class including Mito-C is of therapeutic relevance for pathologies where altered mitochondria dynamics is part of disease etiology and NEET proteins are highlighted. Consistent with the observation that certain viruses modulate mitochondrial morphogenesis as a necessary part of their replication cycle, Mito-C counteracts dengue virus-induced mitochondrial network hyperfusion and represses viral replication.

Biography

Diana Molino has completed her PhD in 2010 in the field of lipid metabolism at INRA-Versailles, followed by postdoctoral studies from Ecole Normale Superieure in neurobiology and mechanobiology. She is now in clinical operations and medical affair field at INSERM in the context of SARS-CoV2 emergency.

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