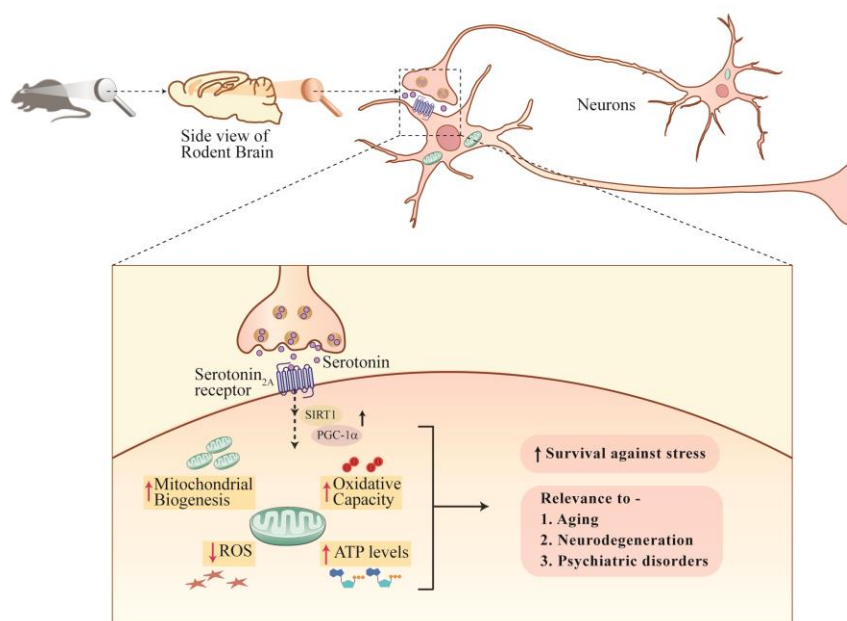


Serotonin boosts neuronal powerplants protecting against stress

Mitochondria in neurons are the powerhouses that generate energy to execute cellular functions and regulate neuronal survival under conditions of stress. Collaborative research by Prof. Vidita Vaidya and Prof. Ullas Kolthur-Seetharam groups at TIFR, along with Dr. Ashok Vaidya, at Medical Research Centre, Kasturba Health Society, has demonstrated an unusual function for the neurotransmitter serotonin, in the generation of new mitochondria—a process called mitochondrial biogenesis—in neurons, accompanied by increase in cellular respiration and ATP, the energy currency of the cell.

These effects of serotonin involve the serotonin_{2A} receptor and master regulators of mitochondrial biogenesis, SIRT1 and PGC-1 α . Serotonin reduces toxic reactive oxygen species in neurons, boosts anti-oxidant enzymes and buffers neurons from the damaging effects of cellular stress. This study (Fanibunda *et al.*, 2019), appearing in the international journal PNAS, uncovers an unprecedented role for serotonin in energy production in neurons directly impacting how neurons handle stress. Mitochondrial function in neurons is vital in determining how neurons cope with stress and the trajectory of aging.

This work provides exciting evidence that the neurotransmitter serotonin can directly influence neuronal powerplants, thus impacting the manner in which neurons grapple with stress. This work identifies novel drug targets for treating mitochondrial dysfunction in neurons, with therapeutic potential for neurodegenerative and psychiatric disorders.



Serotonin action on neuronal mitochondria

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Science Contacts: Vidita A. Vaidya, **E-mail:** vvaidya@tifr.res.in, **Tel.:** 022 2278 2806
Ullas Kolthur-Seetharam **E-mail:** ullas@tifr.res.in, **Tel.:** 022 2278 2721