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Transgenerational effect of morphine administration in male rats on electrophysiological properties of Locus coeruleus neurons of the offspring

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The number of adolescents who use illicit drugs has increased dramatically. Adolescence is a critical period for brain development and maturation. Studies have confirmed that environmental stimuli such as drugs and stress can make long lasting changes not only in the same person but also in the next generation. Among transgenerational studies of substance abuse, there is a lack of studies on the electrophysiological properties of different parts of the brain. Locus coeruleus is the main noradrenergic nucleus in the brain and supply most of the noradrenalin of the prefrontal cortex, the area which is involved in the cognitive control. So, in this study we aimed to investigate transgenerational effect of morphine administration during adolescence on electrophysiological properties of the locus coeruleus neurons of the offspring. Male rats received escalating doses of morphine for 10 days during their adolescence. 20 days after the last morphine injection, male rats were mated with intact female rats and whole cell patch clamp recording was performed in the LC neurons of the offspring. The results demonstrated that some electrophysiological properties of LC neurons of morphine sired animals have changed dramatically compared to saline sired ones. These changes include half width, maximum decay slope and antipeak amplitude of the action potentials. This data suggest that morphine administration lead to subtle alteration in the kinetic of some channels of the LC neurons in the offspring which can affect noradrenalin release in other parts of the brain.

Biography

Narges Pachenari is a PhD student at Tarbiat Modares University. Her major is physiology and she is currently working on her thesis. Transgenerational effect of morphine addiction on pain perception, morphien analgesia and electrophysiological properties of Locus coeruleus neurons is her main field of study. She is so interested in cognitive science area and wants to continue her research in this field.

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