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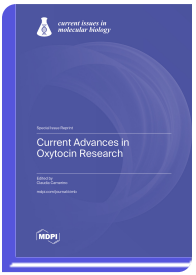
Special Issue Reprint

Current Advances in Oxytocin Research



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In 1950, the amino acid sequences of vasopressin and oxytocin were determined, and both peptides were chemically synthesised. This characterisation of oxytocin led to the Nobel Prize being awarded to Vincent du Vigneaud in 1955. The common evolutionary origin of vasopressin and oxytocin dates back to millions of years ago, which suggests that oxytocin has effects that go beyond uterine contractions and pregnancy. Nevertheless, such evidence was uncovered only in early 2000, when mice depleted of either oxytocin or its receptor were observed to develop late-onset obesity and metabolic syndrome, thus establishing the involvement of oxytocin in the regulation of energy and metabolism. The effects of oxytocin on fat and energy are both direct, since oxytocin is anorexigenic, and indirect, since oxytocin regulates the lean/fat mass composition in skeletal muscle. Peripheral oxytocin promotes osteoblast differentiation and function. Oxytocin acts on fat, muscle, and bone. Evolutionarily, the anabolic effect of oxytocin on bone and muscle makes sense since oxytocin concentrations increase during stressful physiological situations, including pregnancy and lactation in mammals, and triggers aggressive behaviour that, in females, is important for the protection of offspring after labour, when they are most vulnerable to predators and plasma oxytocin is at its peak. This demonstrates that the effects of oxytocin are beneficial in the management of osteoporosis, body fat gain, and sarcopenia, indicating the therapeutic potential but also challenges, namely, to find a single route able to reach all the targets.

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