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Hormonal regulation of sertoli cell proliferation: Role of insulin and IGF-1

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Sertoli Cells (SCs) are essential for sustaining spermatogenesis in adult-hood. The total number of SCs determines the daily gamete production, since SCs can support only a limited number of developing germ cells. Considering that human SCs proliferation only occurs during the immature period, proper development and proliferation of the SCs during the proliferative phase are crucial to male reproductive health in adulthood. Coordinated mainly by Follicle-Stimulating Hormone (FSH) and androgens, the proliferation process is regulated by an assortment of hormonal and paracrine/autocrine factors, which regulate the rate and extent of proliferation. Insulin and IGF-1 signaling are intimately involved in such processes and seem to be the most important signals in regulating the final number of SCs during the pre-pubertal period. Actually, several studies show that metabolic diseases such as diabetes mellitus are related to male infertility, especially altering insulin, LH, FSH and IGF-I plasma levels. Since insulin/IGF-I has an important role in the regulation of SC proliferation, this deregulation is a possible mechanism by which insulin lack may be involved in the development of infertility. The electrophysiological recording of immature rat SCs from whole seminiferous tubules has enabled several observations, which introduce new concepts regarding the mechanisms of action of hormones especially FSH and androgens. Both, insulin and IGF-I cause depolarization on the membrane potential and increase calcium uptake in immature SCs acting on the IGF-I receptor through the PI3K/Akt pathway. Knowing the mechanisms by which insulin and IGF regulate SC function can provide new insights regarding diabetes-related infertility.

Biography

Eloisa da S Loss has completed her PhD in Physiology from Federal University of Rio Grande do Sul, Porto Alegre, Brazil. She is specialized in Electrophysiology of Endocrine Tissues. Currently, she is Head of Department of Physiology in this University. She has published more than 18 papers in reputed journals.

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