

Evaluation of mitochondrial oxygen consumption and organelle distribution in prostatic epithelial cells in intact and castrated rats

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Puberty is an important stage of prostate development, having as one of its main events the beginning of secretory activity by specialized epithelial cells. Among the secretion components, the high concentration of citrate ion stands out, suggesting a blockage of aconitase, the enzyme responsible for citrate conversion in the citric acid cycle. It is known that during the first postnatal weeks the physiological states of the prostate are tightly regulated by androgens, with an expressive increase in testosterone concentration at puberty. However, morphofunctional aspects of epithelial cell mitochondria in variable conditions of androgenic stimulation are poorly elucidated. Therefore, we aimed to verify the organization of the mitochondrial network of epithelial cells and mitochondrial oxygen consumption in ventral prostate (VP) biopsies of rats belonging to two groups in physiologically distinct phases from normal prostate development: *pre pubertal* and *post pubertal*; opposed to a third one induced to androgenic deprivation: *post pubertal killed on day 3 after surgical castration*. The experimental design, including sample size and procedures, were approved by the State University of Campinas Committee on the Use of Experimental Animals (CEUA), under protocols n°. 5146-1/2019 and n° 5383-1/2019. *Airyscan* microscopy images obtained after staining with MitoTracker Red CMXRos + HOECHST 33342 revealed a disparity in the distribution of mitochondrial content throughout the VP epithelial ducts (proximal, medial and distal regions, according to their position regarding the urethra). The absence of androgenic stimulation seems to impact the mitochondrial network promoting the appearance of mitochondrial clusters, despite similar aggregates are also present in proximal regions of pre pubertal rats not subjected to castration. Results obtained by high-resolution respirometry indicated an upward trend in the average respiratory rates in the post pubertal group when compared to the prepubertal animals: ADP (26%), oligomycin (20%) and FCCP (24%). Successively, castration has contributed to a significant decrease in average respiratory rates: ADP (45%), oligomycin (47%) and FCCP (28%). These observations suggest an association between androgenic stimulation and mitochondria in the rat VP, with androgenic deprivation impacting mitochondrial oxygen consumption and promoting morphological changes with the appearance of mitochondrial aggregates.