

Mitochondrial localization of melatonin in salivary glands: ultrastructural evidences

Michela Isola¹, Raffaella Isola¹, Jörgen Ekström², Francesco Loy¹

¹ Dipartimento di Scienze Biomediche, Università di Cagliari, Monserrato, Italia

² Institute of Neuroscience and Physiology, The Sahlgrenska Academy at University of Gothenburg, Gothenburg, Svezia

The storage of melatonin in acinar secretory granules of human salivary glands and the release of the hormone by granule exocytosis following the regulated secretory pathway were recently reported [1-4]. Melatonin was detected principally in secretory granules, but also in small vesicles, rough endoplasmic reticulum and in the nucleus of the cells. Recently, the occurrence of melatonin has been reported in mitochondria [5] as a peculiar site of its function, but the ultrastructural demonstration of melatonin localization in these organelles has not been delved deeper. In this study we showed the fine localization of this hormone in mitochondria by transmission electron microscopy. Bioptic samples of human parotid, submandibular and labial glands were fixed, dehydrated, embedded in Epon Resin and processed to demonstrate melatonin reactivity by the immunogold staining method. In each type of major and minor human salivary glands, the melatonin reactivity was detected in the mitochondrial membranes in secretory cells. Moreover, melatonin was found in mitochondria of ductal cells. Our data provided new morphological evidences of the melatonin localization in mitochondria, fundamental prerequisite for a better understanding the roles of melatonin in human secretory cells.

References

- [1] Isola et al. (2018). Diabetic Status Influences the Storage of Melatonin in Human Salivary Glands. *Anat Rec (Hoboken)*. 301(4):711-716.
- [2] Isola et al. (2016) Dynamics of the melatonin MT1 receptor in the rat parotid gland upon melatonin administration. *J Physiol Pharmacol*. 67(1):111-9.
- [3] Loy et al. (2015). Ultrastructural evidence of a secretory role for melatonin in the human parotid gland. *J Physiol Pharmacol*. 66(6):847-53.
- [4] Isola & Lilliu (2016). Melatonin localization in human salivary glands. *J Oral Pathol Med*. 45(7):510-5.
- [5] Reiter et al. (2018) Mitochondria: Central Organelles for Melatonin's Antioxidant and Anti-Aging Actions. *Molecules* 2018, 23(2), 509.

Key words

Melatonin, mitochondria, immunogold method, transmission electron microscopy.