THE FASCINATING WORLD OF ELECTRON MICROSCOPY: ULTRASTRUCTURAL MORPHOLOGY OF ADRENAL CHROMAFFIN CELLS

Key words: TEM, adrenal medulla, chromaffin cells, secretory granules.

Adrenal medulla, part of sympathetic nervous system derived from neural crest cells, is composed of short interconnecting cords or clumps of secretory cells called chromaffin cells that are modified sympathetic postganglionic neurons without process (they lost their axons and dendrites during embryonic development). The chromaffin cells have abundant membrane-bound granules with diameter of 100 to 350 nm. In humans, two populations of chromaffin cells are distinguished by transmission electron microscopy (TEM): one population secreting epinephrine (E) and one population secreting norepinephrine (NE) (Fig.1). These cells differ by the nature of their membrane bound granules.

Epinephrine secreting cells (80%) have smaller and less electron-dense granules, with a narrow clear halo surrounding the dense homogenous core (Fig.2). Norepinephrine secreting cells (20%) have larger and more

electron-dense granules with wider clear halo around the dense core with irregular shape and eccentric position (Fig.3). The catecholamines account for less 20% of the contents of secretory granules, but large amounts of chromogranins, that appear to impart the density of granules contents, are present. Also, they contain dopamine β -hydroxylase (which converts dopamine to norepinephrine), adenosine triphosphate (ATP), opiatelike peptides (enkephalins), ATP, and Ca^{2+} .

Conflict of interest

The author declares that she has no conflict of interest.

A.A. Gheorghisan-Galateanu

“Carol Davila” University of Medicine and Pharmacy - Cellular and Molecular Biology and Histology, “C.I.Parhon” National Institute of Endocrinology, Bucharest, Romania

Figure 1.

Figure 2.

Figure 3.