Axolots have become interesting tools for various studies such as limb regeneration where programmed cell death triggers regenerative responses in many different organisms [1, 2]. Cardiac mutant axolotls with heartbeat failure due to heart cells’ inability to form organized myofibrils are invaluable for heart disease research [3]. More recently, axolotl eggs were found instrumental in the fight against cancer, and, furthermore, axolotls accepting brain transplant restore function of that brain part. These and other recent investigations show the potential value of axolotl for human health research and thus warrant further investigations on structure-function relationship in various axolotl cells, tissues, and organs. Here we report the ultrastructure of endocrine cells in testes of the axolotl *Ambystoma mexicanum*.

Five male adult axolotls (~ 2 years old) were killed after anesthesia in tricaine methanesulphonate. Testes were removed, diced, doubly fixed with glutaraldehyde-osmium and embedded in epon. Sections double stained with uranyl acetate and lead citrate, were examined in Philips EM 300 electron microscope, at accelerating voltage of 60 kV with a 25 μm objective aperture.

Fig. 1 shows, at low magnification, the general structure of an endocrine testis cell cut longitudinally. The nucleus exhibited a highly irregular and elongated shape, and well visible perinuclear chromatin. In the cytoplasm, numerous mitochondria (average diameter 0.4 to 1.2 μm) and lipophilic granules (liposomes) were seen. Liposomes varied in aspect with respect to lipophilic content: there were empty and translucent liposomes of average diameter 0.35 to 0.7 μm (Fig. 1), liposomes with a central lipophilic granule, translucent periphery, and of average diameter 0.45 to 1 μm (Fig. 1), and lipid-filled liposomes of average diameter 0.3 to 0.9 μm, occasionally fused together (Fig. 2A). Still in the cytoplasm, smooth endoplasmic reticulum (SER), either sparse or abundant (Fig. 2B), sometimes formed a three-dimensional mesh of 30-90 nm thick anastomosing tubules (Fig. 2C).

Mitochondria exhibited vesicles (average diameter 70-100 nm) and tubules that were projected by the inner membrane into the matrix. Tubules were about 15-20 nm in inner diameter, with discrete enlargements where the diameter reached up to 35 nm (Fig. 3A and insets). Fig. 3B (and inset) showed mitochondria cross-sections with tubular structures 20-35 nm in diameter. Such mitochondria with different types of tubules, together with abundant SER, are characteristic of cells producing steroid hormones.

References
Fig. 1: Low magnification of axolotl testis endocrine cell. N: nucleus; m: mitochondria (arrows); L: liposomes (arrows point to liposomes with central lipophilic granule; arrow heads point to empty liposomes).

Fig. 2: A) Lipid-filled liposomes (L); N: nucleus. B) Smooth endoplasmic reticulum (SER); m: mitochondrion. C) Aggregate of smooth endoplasmic reticulum (SER); m: mitochondrion.

Fig. 3: Mitochondria and organization of cristae and tubules inside them; v: vesicles. A) Insets a) and b) show further magnifications of mitochondrial internal structure (x 86,500 and x 144,000, respectively). B) Inset shows a higher magnification (x 50,000) of tubular-like structure inside mitochondria (please see text).