## Ultrastructural changes of the thyreocytes during shedding complex formation sand lizard *Lacerta agilis* L. (Reptilia, Lacertidae) embryos

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The hormonal activity of the thyroid plays important roles during the development and growth of animals. In reptilian species, thyroid activity particularly affects the formation of the shedding complex and regulation of the sloughing cycle (Rupik and Swadźba, 2009; 2010; 2011). The eggs of *Lacerta* were incubated in constant temperature at 30°C and the embryos were isolated in regular sequence of time. The age of embryos was calculated using the table of species development. Throughout developmental stages 17–20, the thyroid primordium contained undifferentiated cellular cords. At developmental stages 21–24, the thyroid anlage was composed of small follicles with lumens. The Golgi complex and the RER developed gradually at developmental stage 25–30. At developmental stage 32, most follicles were outlined by squamous epithelial cells and presented wide lumens filled with a light colloid. The Golgi complex and RER showed changes in their morphology indicating a decrease in the activity of the thyroid gland. At developmental stage 34, the activity of the embryonic thyroid gradually increased, and at the 35$^{th}$ stage, it exhibited the features of a fully active gland. The follicular epithelium cells frequently showed merocrine secretion into follicular lumens. Subsequently activity of thyroid gradually decreased (stages 37–39) and at the time of hatching, it exhibited the features of inactive gland. These ultrastructural changes of thyroid cells coincide with the changes in the differentiating epidermis of sand lizards embryos. The initial shedding complex is formed under the increasing activation of thyreocytes at the developmental stages 34–35. Before hutching the periderm layer detached *in ovo* and this first molting occurred when the thyrocyces were hypoactive.

All specimens used in experiment were captured according to Polish legal regulations concerned with wild species protection (Dz.U. nr 2 poz. 11 z 1984 r., Dz.U. nr 114 poz. 492 z 1991 r.). Department of Histology and Embryology obtained approval of Polish Ministry of Environment Protection and Forestry for performing studies on protected species (DOPog-4201-02-94/05/aj). The sand lizard *Lacerta agilis* L. is not included in Washington Convention of 1973, ratified by Poland in 1991(Dz.U. nr 27 poz.112).

REFERENCES

Swadźba E, and Rupik W. 2009. Light and scanning microscopic studies of integument differentiation in the grass snake *Natrix natrix* L. (Lepidosauria, Serpentes) during embryogenesis. *Acta Zoologica* 90: 30–41.

Swadźba E, and Rupik W. 2010. Ultrastructural studies of epidermis keratinization in grass snake embryos *Natrix natrix* L. (Lepidosauria, Serpentes) during late embryogenesis. *Zoology* 113: 339–360.

Swadźba E, and Rupik W. 2012. Cross-immunoreactivity between the LH1 antibody and cytokeratin epitopes in the differentiating epidermis of embryos of the grass snake *Natrix natrix* L. during the end stages of embryogenesis. *Protoplasma*. 249: 31–42.

## Mitotic and meiotic chromosomes of the Great Rams Horn Snail *Planorbarius corneus* (Linnaeus, 1758) (Gastropoda, Planorbidae) from Lake Kortowskie

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Aquatic organisms are exposed to a progressive degradation of their living environment that may lead to changes in their functional morphology, including the level of genomes and chromosomes. One of the effects of the pollution of aquatic environments may be a disturbance in the process of meiosis for living organisms, such as gastropods. The aim of this present study was the analysis of meiotic and mitotic chromosomes of *P. corneus* individuals inhabiting Lake Kortowskie.

An analysis of meiotic and mitotic chromosomes of *P. corneus* inhabiting Lake Kortowskie was made in order to verify the use of different tissues and colchicine treatments, the hypotonization time and two methods of chromosome slide preparation. In total, 30 chromosomal slides of six individuals were analyzed. The well spread chromosomes were introduced onto the slides by dropping a cell suspension of the mantle epithelium, foot and intestine of each individual, directly injected with colchicine, after 20 min of hypotonization. The karyotype was composed of 2n=36 biarmed chromosomes, thirty metacentrics with the rest being submetacentrics, NF=72. In the gonad, the meiotic chromosomes in spermatogenesis were observed as being in prophase I (leptoten, zygoten, and diakinesis) and in telophase I. In diakinesis 18 bivalents were formed. No disturbances were observed during meiosis. The spermatozoa were typical of aquatic molluscs; consisting of a spherical head, a short midpiece and a long tail.

The results presented here do not reveal any differences between the karyotype of the Great Rams Horn snail from Lake Kortowskie and the karyotypes formerly reported in the published literature, but only confirmed data on the karyotype of this species. However, the results contributed new data on meiotic chromosomes, and the spermatozoa of this species. Insightful observation of meiosis may in the long-run perspective allow the recording of disturbances in this process among snails, caused by water pollution.

REFERENCES

Barsiene J. 1994. Chromosome set changes in molluscs from highly polluted habitats. In: *Genetics and Evolution of Aquatic Organisms*. Beaumont A, *CHAPHALL*: 434–446.

Garbar DA, Garbar AV. 2007. Karyological features of the genus *Planorbarius* (Gastropoda, Pulmonata, Bulinidae) of the Ukrainian Fauna. *Cytology and Genetics* 2 (42): 109–114.