Since the Snake tempted Eve, and hence rid us of Eden, we have had a rather negative attitude towards it. This is so most probably because we know very little about its habits and biology. For centuries the snakes have attracted the attention of humanity. Their distinctive body shape, way of moving, and predatory nature made them objects of worship, heroes of legends and myths. In the culture of the Slavs the snakes imagined mysterious and incomprehensible things. The most common species of the European snake is the grass snake (*Natrix natrix* L.) of the Colubridae family, which can be found in our whole country. It appears that it is worth getting to know this common species of snake better and try to solve at least few mysteries connected with its embryonic development. The key issue, and the crux of this project, is to answer the following question: how does the pancreas, and to be exact its mysterious endocrine part, of the grass snake develop?

The position of reptiles in the vertebrate phylogenesis makes the research of their embryonic development very interesting as it leads to a better understanding of the embryonic development in birds and mammals. Establishing similarities between the developmental processes of the given organ among vertebrates is possible when certain basic criteria are applied. The first criterion is whether the starting material, that is the specific germ layer or its part, allows for comparable structures to appear. The next one is whether the organs developed according to a specific sequence of development are similar. Yet another very important criterion is similarity of the biochemical paths in the differentiating cells and tissues during the embryonic development. Analyzing and understanding these processes depends largely on the determination of the researchers who attempt to bring to light this interesting though neglected group of animals. Pancreas is a glandular organ in the digestive system and endocrine system of all vertebrate species. It serves as two glands in one: a digestive exocrine gland and a hormone-producing endocrine gland. The exocrine part of this organ, secreting pancreatic juice containing digestive enzymes that to break down the proteins, lipids, carbohydrates, and nucleic acids in food and assist digestion and absorption of nutrients in the small intestine. The endocrine part of pancreas producing several important hormones, including insulin, glucagon, somatostatin, and pancreatic polypeptide which circulate in the blood.

Almost all the pancreas embryonic development researches have been carried out so far in the model embryos of fish, birds, amphibians and mammals. There is no information available about the development of the endocrine part of the pancreas, the time of differentiation and the spatial localization of the four main types of the endocrine cells in the reptile embryos. Incomplete understanding of the evolutionary and developmental aspects of the pancreas differentiation in reptiles is a consequence of this fact.

The exceptionality of the reptile pancreas, and snakes especially, consists in the fact that in adult specimens the endocrine part is lien-adjacent and the endocrine islets are bigger than in other vertebrates. Moreover, many endocrine cells of the pancreas of snakes “enter” the lien. Additionally, the cells secreting glukagon are most numerous in the pancreas of the adult snakes as well as in other reptiles.

This type of pancreas can be connected with a unique developmental process, and investigating and understanding it is a great challenge for scientists.

Within the project we intend to conduct the structural, ultrastructural and immunocytochemical research that will allow: 1. Determination in what way is formed the lumen in the pancreatic ducts and acini. 2. Establishing the relation between the localization of the endocrine cells and the structure of the pancreatic buds. 3. Temporal and spatial identification of the endocrine cells types in the differentiating pancreas. 4. Establishing the percentage participation of particular types of endocrine cells within the islets at different stages of embryonic development. 5. Reconstruction of the spatial localization of the endocrine islets within the differentiating pancreas at different stages of embryonic development.

Researches on the reptiles embryonic development are carried out very rarely due to the problems with acquiring the material, breeding, seasonal propagation, determining the age of embryos, or preservation of tissues. My team will deal with these problems successfully thanks to its lengthy experience in researching the reptiles embryonic development, especially snakes.

The age of the embryos will be determined on the basis of the developmental table of the researched species, which meets all the criteria for the normative tables to determine the age of vertebrates. The embryonic tissues will be preserved according to the protocols modified by the team over the years. It should be added that the species of the snake we have been investigating – that is the grass snake – can be used in the future as model species in embryological research for this group of animals due to the fact that it is common in Europe, the females hatch a lot of eggs, the embryonic development under laboratory conditions is relatively short and the developmental table has been compiled. Furthermore, just like all other reptilians in Poland, the grass snake is under species protection, and hence a more detailed understanding of the development of these animals can contribute to their more effective protection. All the researches on the embryonic development of the grass snake are and will be carried out by the team and with the permission of the Local Ethics Committee as well as the Regional and General Directorate for Environmental Protection.