The Mesozoic was a critical interval in Earth's history, among other reasons due to the fact, that it was the time of appearance of the first representatives of all the modern reptilian and amphibian orders, two new animal classes – birds and mammals, as well as the angiosperms. The studies of that era are thus crucial for understanding of the evolutionary processes and events that led to the ascent of the modern biological diversity. Particularly the Triassic, the first division of the Mesozoic, brought important changes to the animal and plant life. The reptiles for the first time dominated the Earth, pushing aside the ancestors and close relatives of mammals, the synapsids, inhabiting new ecological niches and starting the largest in their history adaptive radiation (especially in the archosaur lineage). That increase in biological diversity led to the appearance of new threats, new strategies of predation and new lines of defense. One of such changes, explicitly visible in the fossil record, is the unprecedented in tetrapods parallel appearance of the bony dermal armor in different evolutionary lineages of reptiles – turtles, placodonts, saurosphargids, doswelliids, rauisuchians, aetosaurs, and phytosaurs. Some of these taxa are commonly present in the fossil record of Poland, and among them particularly the turtles of the species *Proterochersis porebensis* Szczygielski & Sulej 2016 are represented by numerous well-preserved remains yielded by the Late Triassic (Norian) outcrop in Poręba near Zawiercie (Silesian voivodship). Turtles are unique among the reptiles due to the structure of their shell, which incorporates not only the dermal (exoskeletal) ossifications, but the perichondral, endoskeletal elements (ribs and vertebrae) as well. The previous studies on the turtles of the genus *Proterochersis* and species *Keuperotesta limendorsa* Szczygielski & Sulej 2016, all belonging to the family Proterochersidae, indicate that this is not only the oldest, but also the most basal group of fully-shelled turtles. Some of the plesiomorphic characters in these animals manifest in the shell. That makes them the best fit for studies of the genesis of the shell in turtles.

In the Triassic turtles reached relatively large taxonomical diversity and geographical range. They are known from the Middle Triassic of Germany (*Pappochelys rosinae*) and from the Late Triassic of China (*Odontochelys semitestacea*), Germany (*Proterochersis robusta*, *Keuperotesta limendorsa*, *Chelytherium obscurum* – specimens housed in London, *Proganochelys quenstedti*), Poland (*Proterochersis porebensis*), Thailand (*Proganochelys ruchae*), Greenland (unnamed form – specimens housed in Copenhagen), Argentina (*Palaeochersis talampayensis*, unnamed form) and U.S.A. (*Chinlechelys tenertesta*). Particular species, although in some cases fragmentary, represent successive stages of the shell evolution and provide valuable information on its genesis, yet many of them still remains insufficiently studied. Such a large diversity justifies the in-depth comparative examination and search for new Middle and Late Triassic paleontological localities, that could fill the gaps in the fossil record of turtles.

The research tasks include the analysis of the Polish and foreign collections of the armored Triassic reptiles with special consideration of turtles in terms of their anatomy, and taking into account the ecological aspect. Besides the studies of the specimens housed in paleontological collections, for all the duration of the project the will be excavations performed in Poręba and other promising localities. The main aim of the study is creation of the coherent, most complete to date model of the tetrapod dermal armor acquisition and evolution based on the Triassic turtle fossils, including the key forms, representing the successive steps of shell evolution. The attention will also be paid to the influence of the composition (the relative layout of the elements) and shape of the armor treated as an integrated whole on its mechanical resistance. For this purpose, the digital reconstructions of the real shells of the turtles representing the earliest evolutionary stages will be used. This will allow to track the changes in the mechanical parameters of the armor in time, and, probably, point out the main directions of evolutionary selection. In selected cases the histological data will also be acquired, which in turtles frequently provides information about the mode of histogenesis (type of ossification – peri-/endochondral, membrane or metaplastic) and their paleoecology (terrestrial, intermediate, aquatic). The acquired data will be confronted with the characteristics of the armor of other tetrapods. Besides the shell, the observations will also concern the morphology of the locomotor apparatus, what will make possible the evaluation of impact of the proceeding adaptations on these animals' mode of locomotion.