

Middle Miocene holothurians (Echinodermata) from the Vienna Basin (Austria)

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Compared to other modern echinoderm groups, the evolutionary history of holothurians is poorly understood, owing to their preservation almost exclusively as microfossils. In comparison to older strata, the Cenozoic fossil record of sea cucumbers is particularly scarce. This is in stark contrast to most other invertebrate groups, in which the fossil record tends to improve with declining age.

The Central Paratethys (Europe) is one of the most intensely studied Neogene basins and has yielded a rich echinoderm fauna including representatives of all modern echinoderm classes. Unfortunately, most of the holothurian sclerites reported from that area by previous authors have been lost. Here we present new data based on a survey of old micropalaeontological samples (second half of the 19th century), deposited in the Natural History Museum of Vienna, as well as new samples collected from deposits rich in echinoderm remains. The samples studied derive from silty clays and marls from the Austrian part of the Vienna Basin and are Badenian (= Langhian to Early Serravallian) in age. The samples were processed to preserve the fine fractions needed for the successful recovery of holothurian sclerites. Out of more than twenty-five samples, only two yielded well preserved holothurian echinoderms.

At least ten biological species of the Molpadiida (Molpadiidae), Dendrochirotida, Aspidochirotida (Holothuriidae), Apodida (Synaptidae, Chiridotidae, and Myriotrochidae) could be documented in form of sclerites from the body wall, as well as calcareous ring elements. Especially the classic 'Badener Tegel'-samples of Baden near Wien (former brickyards between Baden and Sooss) yielded exceptionally well-preserved material. Infaunal molpadiid representatives dominate the faunal holothurian association of the 'Badener Tegel'. This includes the first fossil record of small amorphous ferric phosphatic dermal granules, which are typical for members of the Molpadiidae and a unique biomineralogical phenomenon for the Echinodermata as a whole.