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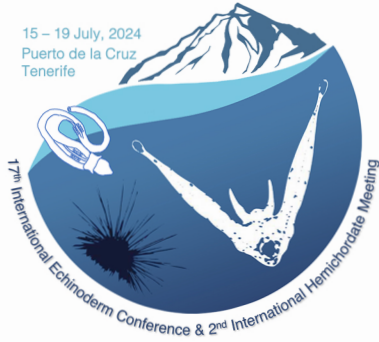


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CONFERENCE BOOKLET

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A MORPHOMETRIC COMPARISON OF FOLDED RESPIRATORY STRUCTURES IN PALAEOZOIC BLASTOZOANS

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By analogy with extant taxa, it is very likely that the ambulacral system was most likely involved in respiration in extinct clades of echinoderms. However, in most members of the subphylum Blastozoa, the theca very often bears pores and/or canals, generally interpreted as parts of highly specialized respiratory structures, as for example: cryptorhombs (glyptocystitids), diplopores (diploporitans), humatipores (holocystitids), humatirhombs (caryocystitids), hydrospires (blastoids), lamellipores (scotiaecystid cornutes), pectinirhombs (hemicosmitids), and sutural pores (e.g., gogiid eocrinoids, cinctans, cornute stylophorans).

Although some of these structures are preserved as perforations in the theca, it seems reasonable to consider that they were originally lined with soft tissue. By offering larger and thinner surfaces, they were playing a key role for gas exchange and therefore, respiration. However, mainly for theoretical reasons, some of these structures (e.g. lamellipores) are still sometimes interpreted as gill openings, with seawater flowing through them to a putative large intrathecal pharynx.

The aim of this study is to test the null hypothesis that multiple types of independently acquired folded respiratory structures in various blastozoan clades cannot be differentiated in terms of basic morphology, because they served the same function, and were therefore constrained by the same biomechanical rules.

A morphometric analysis based on more than 3,000 measurements (e.g. width of lamellae, width of slits) was performed on a representative sample of folded respiratory structures belonging to over 40 specimens of blastoids (hydrospires), glyptocystitids (cryptorhombs), and scotiaecystids (lamellipores). Results clearly demonstrate that, in terms of basic construction, hydrospires, cryptorhombs and lamellipores cannot be differentiated. This suggests that, although convergently acquired in different clades, all of these structures were likely shaped by similar biomechanical constraints and comparable function. There is therefore no reason to consider lamellipores as gill openings. Rather, their morphology indicates that, like cryptorhombs and hydrospires, lamellipores functioned as endothelial respiratory pore-structures.