Ordovician sponge spicules from Spitsbergen, Nevada and Newfoundland: new evidence for the *Hexactinellida* early differentiation

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Division of Hexactinellida into the subclasses Amphidiscophora and Hexasterophora is now generally accepted due to their very distinct types of microscleres, namely amphidiscs and hexasters, respectively. Microscleres of this type have been recognized in the Lower Paleozoic. We examined exceptionally well preserved spicule assemblages from three particular Lower to Middle Ordovician localities: Spitsb ergen (Floian-Dapingian), Nevada (Vinini Formation, Dapingian) and Newfoundland (Cow Head Formation, Tremadocian and Table Head Group, Darriwilian). The presence of hexaster-type spicules, hemidiscs and amphidiscs is reported here. The hexasters are certainly documented from the Lower Ordovician and possibly from the Cambrian. Although hemidiscs were reported from the Lower Ordovician, oldest true amphidiscs were reported from the Silurian. The occurrence of amphidiscs in these localities implies that the Amphidiscophora can be certainly traced back to the Lower Ordovician. The occurrence of five different types of scopules (typical microscleres of the Sceptrulophora) significantly increases the diversity of this group in the Ordovician. The collection also includes important and variable types of hexactinellid spicules (pinular hexactines and pentactines, equinate hexactines, tauactins and inflated pentactines, and different types of uncinate monactins), calcareous heteractines, and different types of demosponge spicules (oxiasters, C-shaped sigmata, trianes and dendroclones).

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