A new method for the separation of different types of nematocysts from Scyphozoa and investigation of proteinaceous toxins utilizing laser catapulting and subsequent mass spectrometry

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Abstract

Jellyfish have an increasing impact on marine ecology. Cnidocysts bearing stinging cells afford, amongst others, prey capture and defence. Several different types of stinging capsules are found in one species and they are supposed to have specific functions, e.g. paralysing prey or adhering it. Due to these assumed different roles of the capsules it is suggested that toxins which are contained in the capsules differ in composition. Analysis of distinct types of nematocysts requires an appropriate method for the separation of the different types. Mixtures of types of nematocysts were obtained of two species of jellyfish, *Aurelia aurita* and *Cyanea lamarckii*, by maceration of the tissue. These mixtures were treated with a method called laser microdissection and pressure catapulting (LMPC). Optimized maceration methods, which were firstly introduced as a method for this purpose, in conjunction with optimized LMPC parameters lead to sufficient amounts of separated capsules of individual types for subsequent mass spectrometric analyses. In case of *A. aurita*, the resulting mass spectra had some constituents in common whereas the overall pattern the two distinct nematocyst types differed.