

# Studies on pinnaic acid family of marine natural products: a biogenetic proposal 海洋天然物ピンナ酸類縁体の研究：生合成仮説の提唱

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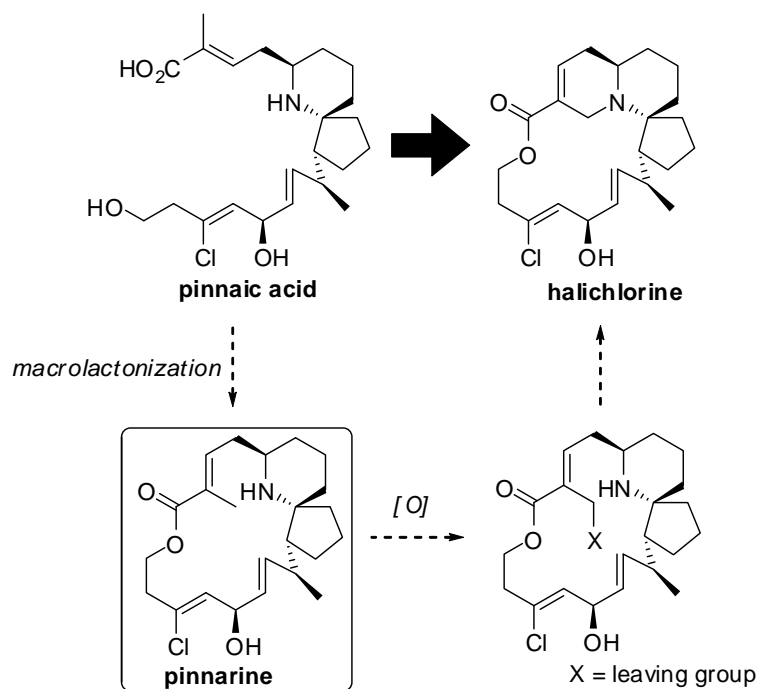
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Pinnaic acid family is a novel class of bioactive marine natural products isolated by Uemura et al., which includes pinnaic acid, taupinnaic acid, and halichlorine.<sup>1</sup> Their bioactivities and novel 6-aza-spiro [4.5] decane structures attracted considerable attention in the synthetic chemistry community. However, as significant problems still exist, asymmetric total synthesis of pinnaic acid has been accomplished only by Danishefsky and us.<sup>2</sup> Structure similarity among pinnaic acid family of natural products also presents the intriguing problem on their biosynthesis.



To prove the biosynthetic relationship between pinnaic acid and halichlorine, we screened many extracts of marine organisms. Finally a novel alkaloid – pinnarine, was isolated, structurally elucidated and synthesized, which allowed us to present a plausible biogenetic proposal of pinnaic acid family, as shown above.

We will also report our recent result of successful synthesis of aza-spirotricyclic core of halichlorine.

1) Uemura, D., et al. *Tetrahedron Lett.* **1996**, 37, 3867-3870, 3871-3874.

2) Xu, S.; Arimoto, H.; Uemura, D. *Angew. Chem. Int. Ed.* **2007**, 46, 5746.