



UvA-DARE (Digital Academic Repository)

Finding patterns and differences on biomineralization-related proteins from Metazoans

Ramos-Silva, P.; Combet, C.; Marin, F.; Kaandorp, J.A.

Publication date

2011

Document Version

Final published version

Published in

Molecular iomineralization in marine organisms: Nanobiotechnology and biomedical application

[Link to publication](#)

Citation for published version (APA):

Ramos-Silva, P., Combet, C., Marin, F., & Kaandorp, J. A. (2011). Finding patterns and differences on biomineralization-related proteins from Metazoans. In V. Matranga (Ed.), *Molecular iomineralization in marine organisms: Nanobiotechnology and biomedical application: Biomintec International Workshop, 2011 Palermo : abstracts* (pp. 21). IBIM-CNR. http://biomintec.ibim.cnr.it/images/stories/book_abstracts.pdf

General rights

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

UvA-DARE is a service provided by the library of the University of Amsterdam (<https://dare.uva.nl>)

Finding patterns and differences on biomineralization-related proteins from Metazoans

P. Ramos-Silva¹, C. Combet³, F. Marin², J. A. Kaandorp¹

¹*Section of Computational Science, University of Amsterdam, The Netherlands(paula.silva@u-bourgogne.fr)*

²*Laboratoire Biogéosciences, UMR5561 CNRS, Université de Bourgogne, France*

³*IBCP, UMR5086 CNRS, Université Lyon 1, France*

The protein sequences associated to calcium carbonate biomineralization in metazoans show particular characteristics since they seem to be organized in different modules and show tendency to adopt unfolded conformations. Some of these modules are of low complexity or seem to be specific for each organism suggesting that evolution is occurring independently multiple times. However, calcium carbonate proteins also show some remarkable sequence similarities and conserved domains in distantly related organisms, which suggest a Precambrian origin of the genes. For the first step of our work we compiled in a semi-automated manner a calcification-related proteins reference set. This collection could bring together all the domains, motifs and functions described until now in the biocalcification process. This data-set is currently in use to:

- 1) Develop an automated selection and analysis of the protein sequences associated to calcium carbonate mineralization in metazoans. Recently we were able to group these proteins by homologous regions and we are currently analyzing these results. The main goal is to characterize new motifs and domains, establish new functional relations and integrate these data into a specialized database.
- 2) Identify common biochemical and biophysical properties like high acidity, repeats sequences, little or no secondary structure, propensity for trans-membrane helices, and high percentages of highly acidic amino acids (Asp, Glu, and Ser) in protein composition, etc. In order to construct property profiles for known biomineralization proteins.

In a second part we expect to apply these profiles to predict biomineralization proteins from unknown gene sequences. For that purpose we expect to do a transcriptomic analysis of a coral species, *Acropora millepora*, recently subject to severe bleaching events. The transcriptomes obtained will be used together with the profiles in order to predict biomineralization genes.