



C4. PHYSIOLOGICAL MARINE GENOMICS: TOOLS AND CONCEPTS

Instructor: Inna Sokolova

Course outline-lectures

- Introduction to concepts of genomics, transcriptomics, proteomics.
- From genomes to functions in aquatic biology.
- Environmental research in aquatic milieu can benefit much from functional genomics.
- Linking genes as well as gene regulation to the function of complex biological pathways.
- Linking genes and pathways to physiological functions.
- Functional genomics of physiological plasticity.
- Genomics-enabled research in marine ecology: challenges, risks and pay-offs.
- Marine proteomics-Applications of proteomics in marine ecology.
- Integration of genomics and proteomics into marine ecology.
- Proteomics for the Analysis of Environmental Stress Responses in Organisms.
- Advanced technologies in genomics research and their applications in various physiological studies.
- Tools for quantification of genes expression within organisms.
- Using functional genomics to explore the effects of ocean acidification on calcifying marine organisms.
- Global warming and the use of proteomics and genomics in the assessment of environmental risks.
- Gene expression in the intertidal mussels: physiological response to environmental factors on a biogeographic scale.

Suggested Readings

Victor J. Nesatyy and bMarc J.-F. Sut. (2007). Proteomics for the Analysis of environmental Stress Responses in Organisms. Environmental Science and Technology Vol. 41, No. 20, 6891-6900.

J. Mark Cock, Kristin Tessmar-Raible, Catherine Boyen, Frederique Viard. Introduction to Marine Genomics / Edition 1, ISBN: 9048186161, Springer Netherlands.

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Stewart C. Johnson, Howard I. Browman (2007). Introducing genomics, proteomics and metabolomics in marine ecology. *Mar Ecol Prog Ser*, Vol. 332: 247–248.

Gretchen E. Hofmann, Sean P. Place, (2007). Genomics-enabled research in marine ecology: challenges, risks and pay-offs. *Mar Ecol Prog Ser*, Vol. 332: 247–248.

Gracey AY, Cossins AR (2003) Application of microarray technology in environmental and comparative physiology. *Annu Rev Physiol* 65:231–259

Lars Tomanek (2011). Environmental proteomics: changes in the proteome of marine organisms in response to environmental stress, pollutants, infection, symbiosis, and development. *Annu. Rev. Mar. Sci.* 2011. 3:14.1–14.27.