E-learning for marine biotechnology: an example with a metagenomic approach

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Bioinformatics has pervaded all fields of biology and has become an indispensable tool for almost all research projects. Hence the demand for graduates well-trained in bioinformatics has grown. Teaching bioinformatics has been incorporated in all traditional life science curricula. Better than teaching stand-alone bioinformatics, it would be useful to stress multidisciplinary and problem-solving aspects. Since bioinformatics relies heavily on the use of computers, e-learning is particularly convenient, but few examples have been produced so far.

We present a tutorial that starts from a practical problem: finding novel enzymes from marine environments. First, we introduce the idea of metagenomics, a recent approach that extends biotechnology with non-culturable microbes. We then lead the students through databases such as BRENDA, and programs such as BLAST and Clustal Omega. Lastly, we let the students querying these databases about molecules found in marine environments. At the end of the experience, students will have acquired practical knowledge of bioinformatics fundamentals.