Unifying the Curriculum: Isocitrate Dehydrogenase (IDH) as a Model Enzyme

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A subset of the Biology Department at Davidson College has devised a novel paradigm to unify their portion of the curriculum: We have adopted isocitrate dehydrogenase (IDH; EC number 1.1.1.42) as a model enzyme. The paradigm enables students to integrate the information from different courses more easily and fosters faculty collaborations. The courses affected fall under the heading of "cell and molecular" and could include: introductory biology, biochemistry, cell biology, development, genetics, microbiology, and molecular biology. The purpose for adopting an enzyme is to facilitate several pedagogical objectives. IDH is an enzyme that is often covered in courses, while peroxidase and tyrosinase (enzymes frequently used in teaching labs) are not often covered in lecture. We want students to learn that each discipline within biology has different tools to look at different aspects of common concern. Students learn that disciplines/courses with distinct boundaries are artificial separations of a continuum of biology. We want students to benefit from learning about one enzyme early in their careers, and then use this as a model system in upper level courses. Students can conduct pedagogical research and/or basic research on this enzyme as a part of independent research courses. Using IDH has eliminated toxins required with more traditional enzymes. This unifying enzyme has increased collaborations among faculty members to develop new investigatory labs. It allows us to take advantage of the genome organisms and the huge databases that are freely available. The mini workshop will provide specific examples of what we have begun, and provide protocols when available. The IDH lab for introductory biology and/or biochemistry is one of the full workshops (see Williamson and Campbell, this volume). The IDH web page can be found at <http://www.bio.davidson.edu/Biology/IDH.html>.

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