SISMA: A SOFTWARE FOR DYNAMIC SIMULATION OF METABOLIC PATHWAYS IN BIOCHEMICAL EDUCATION

Macedo, J.A.¹, Matos, N.F.¹, Paula, M.M.V.¹, Silva, L.E.¹, Schneedorf, J.M.²; Brigagão, M.R.P.L.¹

¹J-Tec, Dept Ciências Exatas, Universidade Federal de Alfenas, Alfenas, Minas Gerais, Brasil. ²Lab. Bioquímica, Dept. Ciências Exatas, Universidade Federal de Alfenas

The main purpose of metabolic pathway charts is clarifying the flow of reactants and products devised by enzyme catalytic reactions. Learning the wealth of information in metabolic pathways, however, is both challenging and overwhelming for students, mainly due to the static nature of printed charts. In this sense the goal of this work was to develop a software environment for metabolic chart studies, enhancing both student learning and retention. The system named SISMA (Sistema de Simulações Metabólicas) was developed using the Unified Modeling Language (UML) and Rational Unified Process (RUP) tools for specifying, visualizing, constructing, and documenting the software system. SISMA was modelled with JAVA programming language, due to its versatility, efficiency, platform portability, and security. Use Case diagrams were constructing to describe the available functionality of the software and the set of scenarios describing the interactions with the end user, with constraints defined by Business Rules. In brief, SISMA can dynamically illustrate standard and physiopathological flow of reactants, create and modify compounds, pathways, and co-factors, and report kinetic data, among others. In this way SISMA can be used as a complementary tool on both conventional full-time as distance learning courses in biochemistry and biotechnology.

Financial support: CNPq, FAPEMIG