



## CETICSDB: A PLATFORM FOR INTEGRATION AND ANALYSIS OF HIGH-THROUGHPUT -OMICS DATA AND MATHEMATICAL MODELING OF BIOCHEMICAL REACTIONS

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**Introduction.** The Center of Toxins, Immune-response and Cell Signaling (CeTICS) studies biochemical, molecular, and cellular mechanisms of toxins that have therapeutic potential, aiming to understand the behavior of biological systems based on analysis of high-throughput data and signaling networks. Research and analyses in CeTICS are intrinsically interdisciplinary, involving the usage of heterogeneous, high-throughput data from genomics, transcriptomics and proteomics. Once high-throughput data and biological knowledge have increased rapidly in the last years, such information must be properly integrated and then crossed with signaling diagrams and biological annotation to yield meaningful results.

**Objectives.** CeTICSdb aims to provide a user-friendly management system that fully supports access control, data management (e.g., data submission attached to their semantics, automatic preprocessing, visualization and sharing), automated customized real-time analyses and simulations, and application of multivariate methods to the integration and comparison of multiple datasets on different –omics technologies.

**Materials and Methods.** The platform is a Django-based web interface, with integration on progress with the Galaxy workflow manager and the GBrowse suite; both are suitable for quantitative and qualitative –omics analysis. Mathematical modeling of biochemical reactions is provided by SigNetSim, a framework in Python developed by our group. The platform is currently running in a high performance server, which processes all user requests through a cluster queuing system.

**Results and Discussion.** To validate the CeTICSdb platform, we integrated transcripts or protein expression profile and metabolic pathways to: i) estimate the metabolic activity between different conditions or treatments; ii) define and compare the functional activity for the metabolic pathways in each condition. Nevertheless, our mid-term objective is to make this platform available as a dry lab to the scientific community.

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