
Future Plans: Primary Directions

Peer-Review of US EPA - National Exposure Research Laboratory's
Human Exposure and Dose Simulation University Partnership (HEADSUP) Program
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by

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Reconstruction of the Plume of Resulting Exposures from World Trade Center Collapse and the Fires that Burned Until 12/14/2002

- Plume dispersion modeling and source reconstruction
- Characterization of spatial/temporal attributes of exposures for risk assessments
- Development of exposure profiles for epidemiological studies and collaboration with long term studies

-Year 5 and 6

- Analysis of simulations for assigning and optimizing new sampling strategies for catastrophic events that may lead to high acute/chronic exposures
 - *first response*
 - *triage for response after the event*
- Year 6 and beyond

PM Source-to-Dose Modeling for Tampa, Florida

- Assist in designing field sampling strategy for measuring population exposures
- Use field data and extant data to develop population exposure/dose profiles
- Provide analyses that all to discriminate the levels of exposures and doses due to automobile PM emissions from local power plant primary and secondary emissions and formation of PM

Year 5 and beyond

Provide Enhanced Analysis of Multimedia Toxics for Population-Based Exposure and Risk Assessments

- Systematic Analyses of NHEXAS, NHANES, NATA, and other (existing and planned) databases to develop and evaluate a variety of exposure and dose profiles for use in risk assessments
- Systematic comparisons of the impact of data resolution using different levels of detail in databases and models
- Systematic comparison of individual-based versus population-based
- Characterization of variability associated with various elements of the source-to-dose assessment (source, environmental, microenvironmental, physiological, biochemical, etc.)
- Applications for population based risk characterization and assessment assessment

Year 5 and beyond

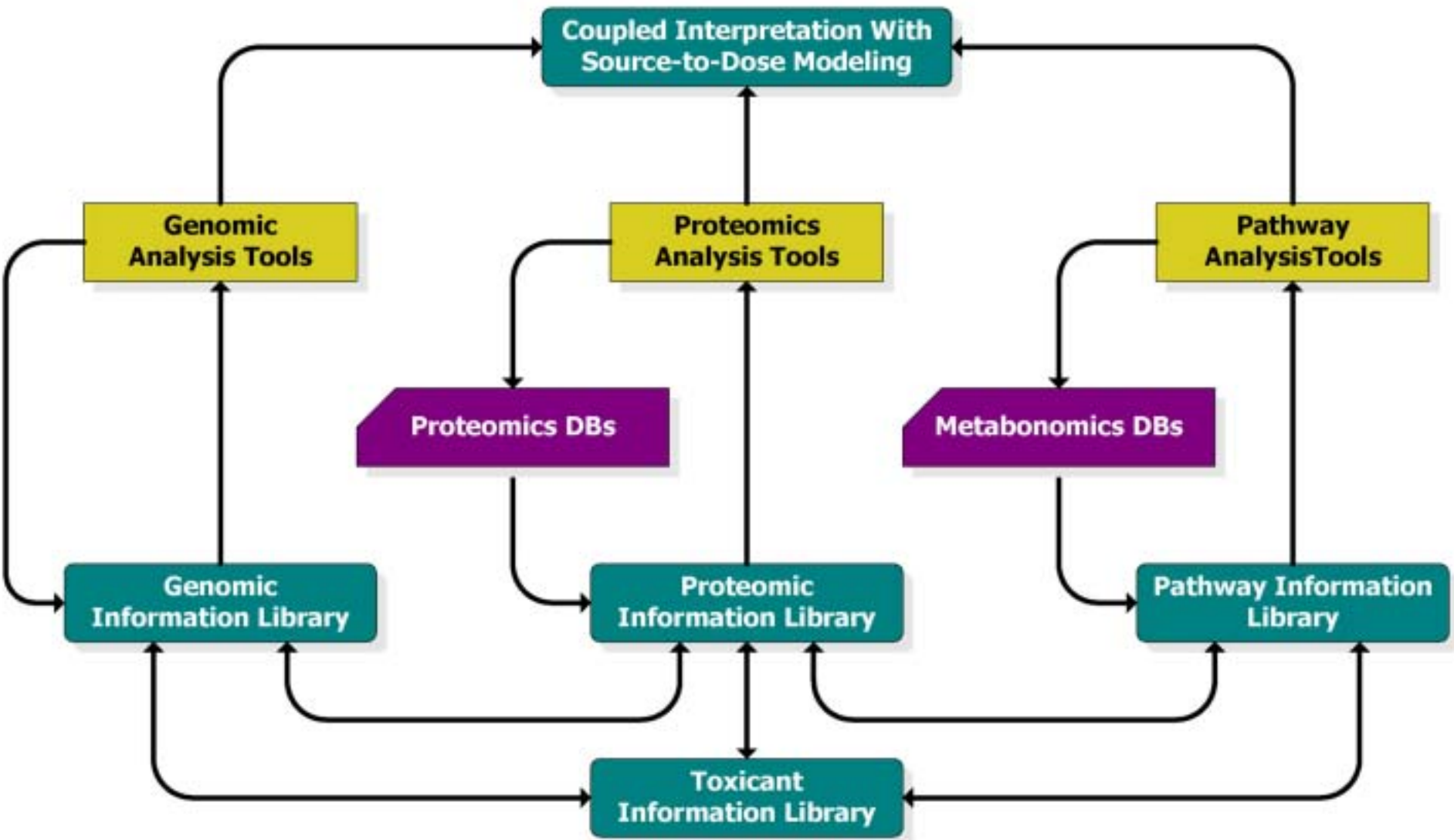
Computational Biology/Toxicology (Collaboration with EPA-NERL)

- a) Implementation of efficient algorithms in Bayesian framework to improve analysis of “-omics” data
- b) Refinement of methods for the prediction of exposure from biological marker data
- c) Incorporate interpretation of micro-array data and proteomic data within the source-to-dose modeling framework to assess metabolic pathways and provide better characterization of risks
- d) Collaboration on reducing uncertainty using Bayesian computational techniques to predict parameters for mechanistic biological models

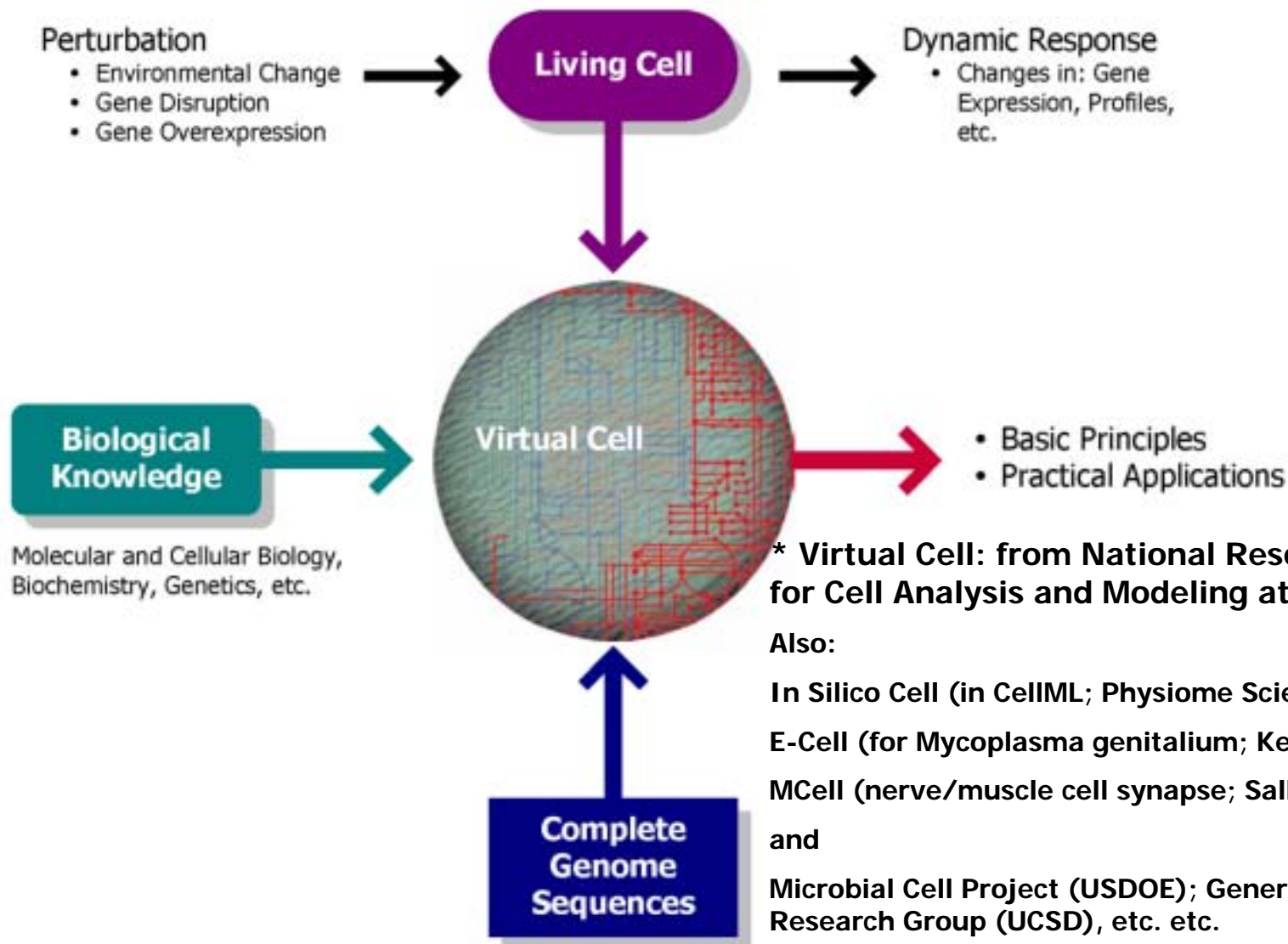
Year 6 and beyond

Inclusion of Dr William Welsh, Director of UMDNJ Bioinformatics Institute, and his group as members of the MENTOR Team

Future Applications Should Take Advantage of an Expanded Toxicoinformatics Architecture to Support Dose and Risk Assessment...



... and Incorporate Virtual Cell* Dynamics for Mechanistic Computer Simulation of Biological Function



User Friendly Environment for Applications of MENTOR

- Continue the development of user friendly computational tools (web and GIS based) for MENTOR applications in conjunction with various EPA models
- Development of user training and support material and mechanisms, for MENTOR applications to needs of EPA program offices and EPA Regions, and the scientific community at large
- Continue the refinement and expansion of the MENTOR System with new and improved modules from EPA and LBNL

Year 6 and beyond