Engaging Deep Biology and Bayesian Artificial Intelligence to Decode Addiction and Systemic Adaption in a Data Driven Approach

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Risk factors for drug and alcohol abuse are complex and determined by a combination of underlying biology along with environmental elements that encompass an individual. The BERG Interrogative Biology® platform has adopted a broad systems biology approach incorporating human biology along with a wide range of environmental factors that identify drivers of health outcomes in a data driven manner. The platform's causal inference approach is data agnostic and can identify socioeconomic, demographic, clinical, and biological drivers of neurological disease without an a priori knowledge allowing it to be purely data driven.

Discussion: The BERG Interrogative Biology® platform is focused on identifying novel biology through the capture of adaptive omics (proteomics, post-translational modification, metabolomics, neurometabolomics, and lipidomics) along with the incorporation of genomics and clinical, demographic, and electronic data that can be interrogated in an agnostic manner using Bayesian analytics. OMIC data can be collected from blood, plasma, serum, saliva, sweat, tears, buffy coat, and exosomes that captures an individual's adaptive biological phenome. Demographics, economic, stress dynamics, mental health history, education status, access and willingness to treatment and any other specifics can be incorporated to further define the individual's "phenotypic" profile, providing valuable input on the impact of the underlying biology. The "clearbox" AI tool bAIcis® at the back end uncovers cause-and-effect relationships from the data without any prior hypothesis to delineate markers and traits that predict an individual's predisposition for drug or alcohol abuse disorder, and to identify novel drugs or procedures to support the treatment of substance dependence. The capability of BERG platform to use RWD and molecular data in bringing new knowledge to the prediction and management of substance addiction is of great value to physicians, insurance providers, government agencies and the many victims of addiction.