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TITLE: A Comprehensive Biobanking Ontology of the Lifecycle of the Biospecimen Made For-and-With Diverse Subject Matter Experts

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ABSTRACT BODY:

Abstract Body: Problem Statement: The field of biobanking demands data integration. Biobanks commonly evolve for diverse research needs with heterogeneous data representations presenting challenges to query for samples and associated clinical annotations across biobanks, within and across institutions. Moreover, there are ethical and regulatory requirements for the use of specimens and data, including documentation and adherence to the permissions and restrictions expressed by research participants during consent.

Proposed Solution: The Ontology for BioBanking (OBIB) has been developed and refined through engagement and collaboration with several academic medical institutions, national scientific biobanking forums and national standards organizations. An ontology provides clearly defined terms and the relationships between them in a computer-interpretable way, enabling integration of disparate data into one harmonized, reusable system. OBIB was developed following principles of the Open Biomedical Ontologies Foundry, which requires re-use of existing interoperable ontologies in order to prevent multiple representations of the same entities. The scope of OBIB is the Lifecycle of the Biospecimen as defined by NCI's Biorepositories and Biospecimen Research Branch (BBRB), starting with the participant consent process. Important aspects of informed consent are addressed by cross-linking with the Informed Consent Ontology (ICO). OBIB leverages work done on data elements from biobanks at academic institutions as well as the NIH Genotype-Tissue Expression (GTEx) Project and the NCI's BBRB. The contributions from GTEx include comprehensive research authorizations related to post-mortem tissue donation, and terms from the BBRB relate to pathology staging and grading, specimen annotation and medical history. OBIB classes are being linked to terms in MIABIS (Minimum Information About BIobank data Sharing) version 2.0. OBIB currently contains 1970 terms including 1617 classes, of which 130 terms originated from Ontologized MIABIS (OMIABIS) and 1234 were imported from other ontologies.

Conclusion. The continued development of OBIB benefits from the diverse members of the collaboration. OBIB provides a solution for identifying specimens for research, and effectively using the wealth of information present in biobanks by integrating data stored in those repositories, with clinical data and relevant consents. OBIB is freely available at https://bioportal.bioontology.org/ontologies/OBIB

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