Capturing cancer initiating events in OncoCL, a cancer cell ontology

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Abstract

We have developed an ontology, OncoCL, to classify cancer cells and provide a framework for consistent annotation of cancer-associated data from conventional surgical pathology and cancer molecular biology for the purpose of access, comparison, and analysis. The cell type ontology, CL, describes normal cell types and was not designed to capture the pathology of cancer cells. OncoCL builds upon CL, as a canonical cell (represented in CL) undergoes oncogenic change and tumorigenesis with the acquisition of the cancer hallmarks described by Hanahan and Weinberg.

The characterization of cancer initiating cells and cancer initiation events present particular challenges – for example, the representation of the self-renewal and differentiation potential of cancer stem cells compared with those of canonical (normal) stem cells. But we know that the distinction of high-risk precursor lesions with a high likelihood of developing into cancer, compared with indolent disease, depends on the synthesis of complex, heterogeneous data related to cancer initiating cells. OncoCL is a flexible resource specifically developed to integrate these diverse data through the reuse of a number of other biomedical ontologies. This work will present the problems we encountered capturing cancer initiating events and the solutions we implemented to address them.