The DC-THERA Directory: A Knowledge Management System to Support Collaboration on Dendritic Cell and Immunology Research

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Abstract

We present a Knowledge Management System aimed at supporting collaborative research among participants in DC-THERA ("Dendritic Cells & Novel Immunotherapies"), a European Network of Excellence (NoE) in the field of dendritic cells and novel immuno-therapies for cancer and infectious diseases.

The DC-THERA Directory is intended to support a range of activities which spans from base research to clinical and pharmacological applications. It supports these activities by enhancing semantic integration of information, participant communication and by providing a consistent reference knowledge base about dendritic cell research.

The development of the DC-THERA Directory heavily relies on ontologies and Semantic Web-based knowledge representation to achieve these goals. In particular, the information content in the DC-THERA Directory is structured in an instance layer and in an ontology layer. The instance level of the DC-THERA Directory contains research expertise available within the network, such as, in the current release, data sets, protocols and bio-materials, together with the participating institutions and persons. The ontology layer of the Directory consists of a set of ontologies part of the Open Biomedical Ontologies (OBO) family and of additional classes and relations relevant for the characterization of the research expertise of the NoE.

The ontology layer provides semantically sound categorization and links among instances contained in the Directory. Furthermore, it is the basis to provide functionalities such as improved querying (e.g., by considering spelling variants, synonyms, sub-concepts) and guided annotation (properties relevant for the annotation of an entity are suggested to the user based on their domain/range and potentially on current annotations).

The Directory implementation is based on a MVC web architecture, driven by a combination of a traditional Object-Oriented model and RDF-like features.

The informatics infrastructure that we are building to support the goals of enhanced collaboration and a common reference point can potentially be extended to a wider community and other know-how arising from Life Sciences-related research projects.