



SEALIFE

A Semantic Grid Browser for the Life Sciences Applied to the Study of Infectious Diseases

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Objectives

- Conception and realisation of a **Semantic Grid Browser**, which **links the current Web to the emerging eScience infrastructure**
 - **Many grids, few users:** make Web servers and services accessible to end users
 - **Semantic Hyperlinks:** use ontologies and background knowledge to map web contents to services
 - **Shopping cart:** service composition and enactment module
- **Applications: from cells via tissue to patients**
 - Evidence-based medicine
 - Patent and literature mining
 - Molecular biology



Evidence-based medicine

- NELI: "Ribavirin with or without alpha interferon for chronic hepatitis C".
- The Sealife browser identifies hepatitis as disease and interferon as a cytokine and immunologic factor
- It offers links to Ensembl and PDB and literature on interferon type I or liver diseases.



Patent and literature mining

- Patent: "An improved infant formula is described which includes a phospholipid supplement in order to more closely resemble the composition of human milk."
 - The browser offers the following definition for „Phospholipid metabolism“: The chemical reactions and physical changes involving phospholipids, any lipid containing phosphoric acid as a mono- or diester.
 - It also identifies human in its taxonomy and can provide further information on phospholipids in humans
- Which enzymes are inhibited by levamisole? The browser identifies terms like „alkaline phosphatase“ or „phosphofructokinase“ as enzymes and answers accordingly.



Molecular Biology

- ``Rabaptin-5 interacts with the small GTPase Rab5 and is an essential component of the fusion machinery for targeting endocytic vesicles to early endosomes``.
- The browser identifies
 - ``Rabaptin-5`` and ``Rab5`` as protein names,
 - ``endocytosis`` as biological process, and
 - ``early endosome`` as cellular component.
- The browser offers to search sequence databases for Rab5 proteins and to move it to the shopping cart.
- Visting the shopping cart, the browser offers domain searches.
 - For Rab5, this results in the identification of a GTPase domain.
 - A multiple sequence alignment is displayed from the domain database



Team

- Dresden
 - Protein interactions from structures and text
 - GoPubMed.org
 - Supercomputing: 3000 CPUs + 6 TB main memory
 - Biotec (bio groups and companies)
- Edinburgh
 - Service composition and grid computing
 - Edinburgh Mouse Atlas
 - National eScience center
- London
 - Medical informatics, digital libraries, agent technology
 - National Electronic Library of Infectious Diseases
 - Close links to NHS and WHO



Team

- Manchester
 - MyGrid and bio-ontologies
 - Gohse
 - Local eScience center
- Scionics
 - Bioinformatics service
 - Apart: high-throughput annotation of proteins
 - Endocytosis
 - 22 staff, customers in US and Europe
- INRIA Sophia-Antipolis
 - Knowledge management and ontologies
 - Corese: Conceptual resource search engine



Team

- All partners have published in relevant journals/conferences such as Bioinf., ISMB, BMC, NAR, ICDL, ECAI, Nature
- Equal opportunities: EU's 40% target for females exceeded!
- All partners have already developed relevant software platforms and contents
 - GoPubMed.org, Gohse, Neli, Corese, EMAP, Apart
- All partners provide or have access to potential users



Work packages

- Technology
 - Ontology design
 - Textmining and natural language processing
 - Web/Grid services
 - The SeaLife browser
- Applications
 - Evidence-based Medicine
 - Patent and Literature Mining
 - Molecular Biology
- Technology transfer and awareness
- Management



Dissemination

- Advisory board
 - W3C, Pfizer, AstraZeneca, National Health Service, Public Health Agency Canada
- Industry and academic events
 - ELSO, PSB, Embrace, REWERSE & KnowledgeWeb
- Online prototypes
- Reaching students: Manchester and Dresden run dedicated international master programs
- Reaching researchers:
 - Dresden, Manchester, Edinburgh, Sophia-Antipolis are members of the NoE REWERSE and KnowledgeWeb
 - Manchester is member of Embrace
 - Dresden Biotec and MPI, Manchester Northwest Institute of Biohealth Informatics, Edinburgh Medical Research Council, London Hospitals



Sealife facts

- Funding: 2.2M EUR from 2006-2009
- Ranked no. 1 out of 150
- Partners: Dresden, Edinburgh, Manchester, London, Inria Sophia-Antipolis, Scionics
- Advisory board: W3C, Pfizer, AstraZeneca, NHS, Nat. Health Agency Canada
- Work packages on
 - Ontologies, textmining, service composition
 - Evidence-based medicine, Patent and literature mining, Molecular biology
- Semantic Hyperlinks and Shopping Cart
- Read more at www.biotec.tu-dresden.de/sealife