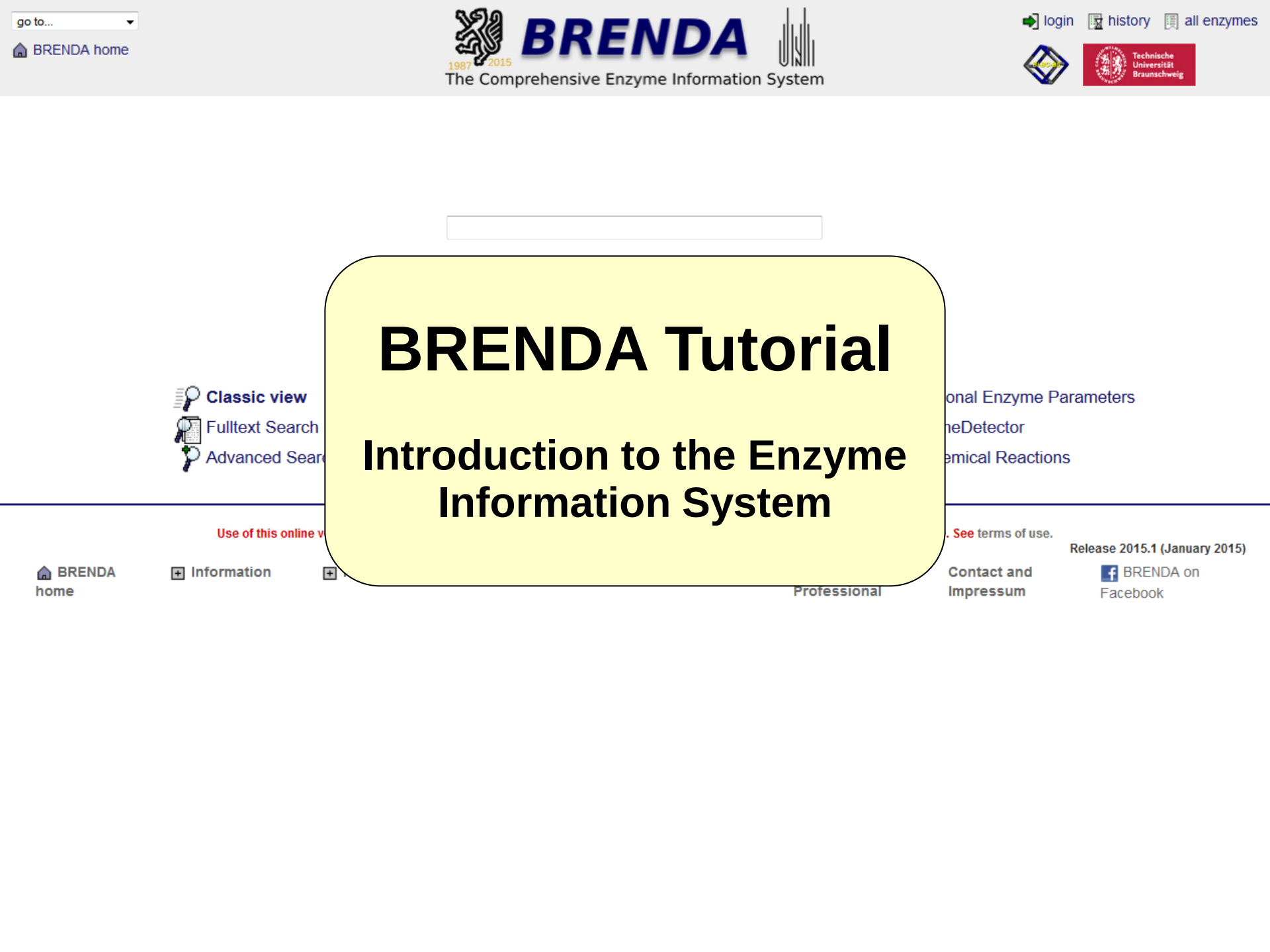
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BRENDA home
BRENDA
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The Comprehensive Enzyme Information System
login
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all enzymes
Technische Universität Braunschweig
Classic view
Fulltext Search
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Release 2015.1 (January 2015)
BRENDA home
Information
Professional
Contact and Impressum
BRENDA on Facebook
BRENDA Tutorial
Introduction to the Enzyme Information System

Facts about BRENDA

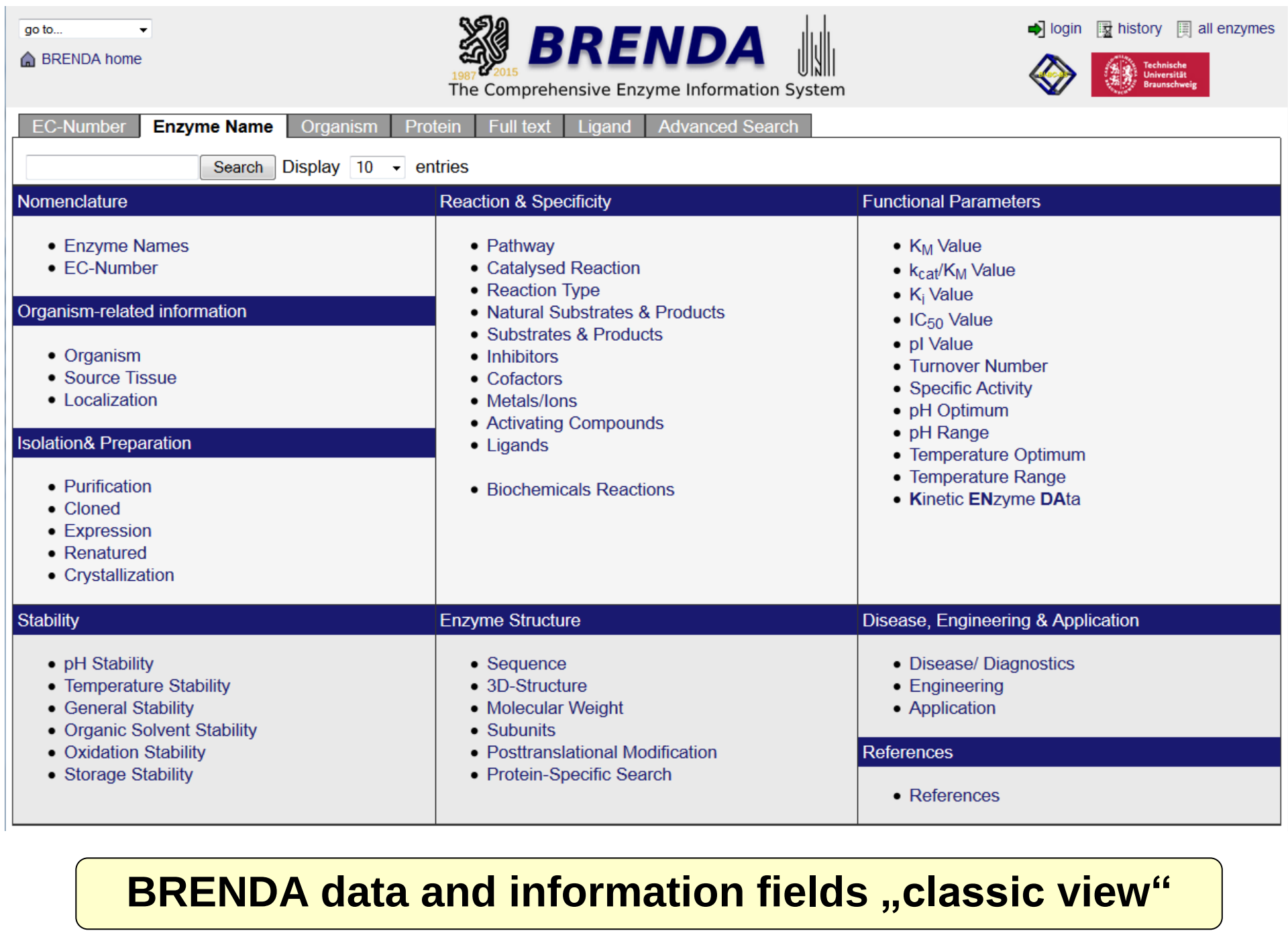
- BRENDA (**BR**aunschweig **EN**zyme **DA**tabase)
- one of the most comprehensive enzyme information repositories
- all enzymes, classified by the Enzyme Nomenclature (IUBMB)
- data of molecular biology, biochemistry, medical research, and biotechnology
- furthermore BRENDA includes data from interconnected databases containing results from text mining methods and bioinformatic approaches.
- BRENDA is freely available to the scientific community
- more than 80,000 visits of the BRENDA website each month
- major updates of the data in BRENDA are performed twice a year

History and major developments of BRENDA

- BRENDA was created at the former German National Research Center for Biotechnology (GBF, now HZI, Helmholtz Zentrum für Infektionsforschung) in 1987
- BRENDA was originally published as a series of book
  - 1st Edition 1990-1997 (Enzyme Handbook)
  - 2nd Edition 2001-... (Handbook of Enzymes)
- BRENDA moved to the University of Cologne
- First online version in 1998 via the SRS system at the EBI
- First website of BRENDA in Cologne
- Transfer of BRENDA into a fully relational database system
- BRENDA moved back to Braunschweig in 2007
- BRENDA is now maintained and further developed at the Department of Bioinformatics & Biochemistry at the TU Braunschweig

Facts about BRENDA

- the main categories are based on the **Enzymes** and the **Metabolites / Ligands**
- enzyme-related data encompasses information on:
  - Enzyme and ligand nomenclature
  - Organism
  - reaction and specificity
  - Kinetic properties
  - Structure and role of the ligands
  - Stability information
  - Ligand-enzyme information
  - Enzyme sequence and structure
  - Mutants and disease
  - Occurence, isolation and properties



BRENDA data and information fields „classic view“

BRENDA is the most comprehensive information system on:

- 6671 EC Numbers (January 2015)
- more than 1.9 Mill. different enzymes
- more than 3 Mill. enzyme data, manually annotated from more than 130,000 literature references

Enzyme Commission numbers (EC Numbers) are defined according to the catalyzed reaction

Enzyme nomenclature is defined by the IUBMB
(International Union of Biochemistry and Molecular Biology)

Format: **Four** numbers separated by periods, e.g. 1.2.1.2

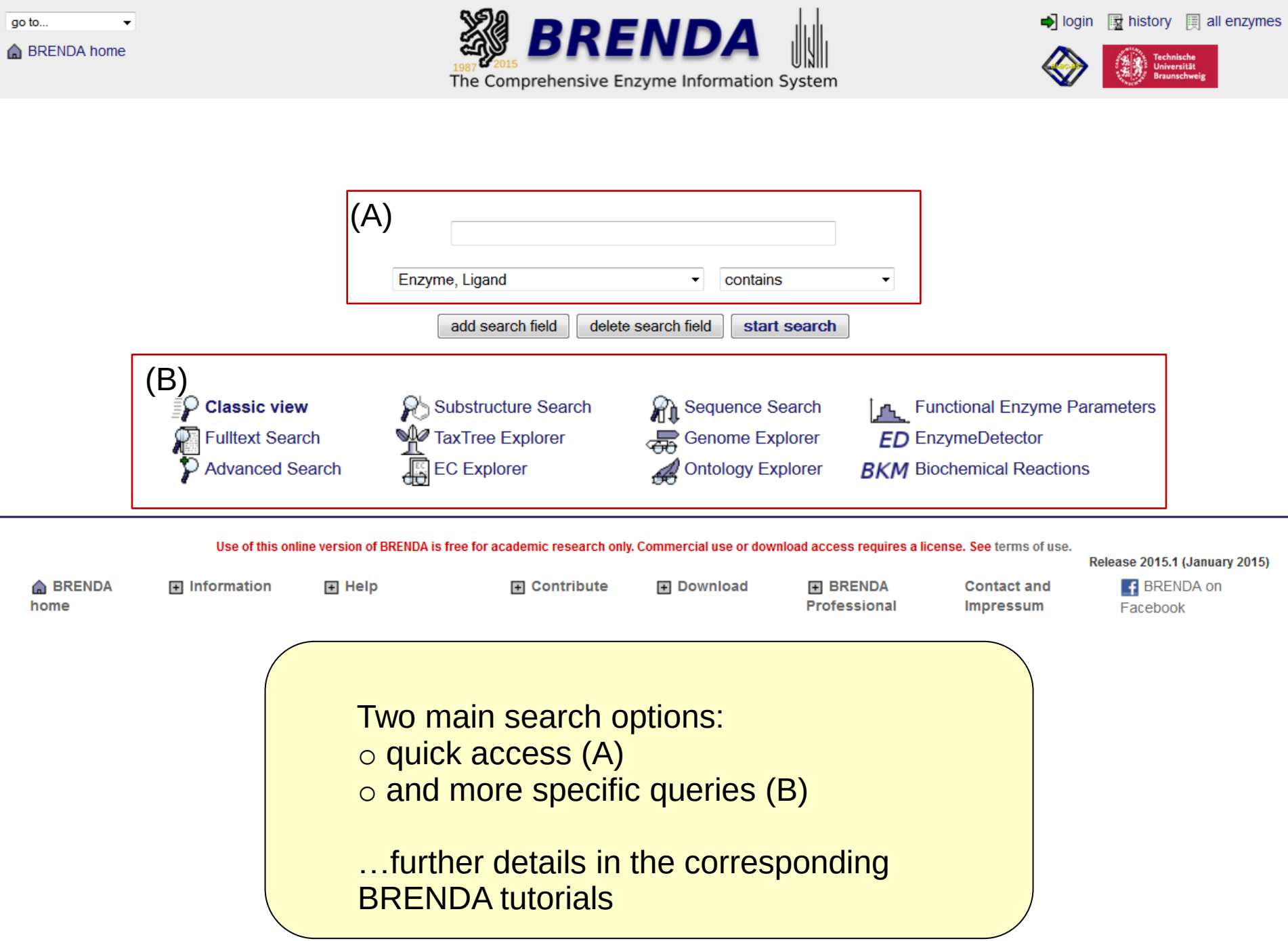
Main Enzyme Classes:

1 Oxidoreductases
2 Transferases
3 Hydrolases
4 Lyases
5 Isomerases
6 Ligases

Numbers represent from left to right a progressively finer classification scheme

EC 1.2.1.2 **Formate + NAD^+ = CO_2 + NADH**

- **formate dehydrogenase**
- **with NAD+ or NADP+ as acceptor**
- **acting on the aldehyde or oxo group of donors**
- **oxidoreductase (main class)**



Two main search options:

- quick access (A)
- and more specific queries (B)

…further details in the corresponding BRENDA tutorials

Data sources & updates: Merge and process of data

Text mining data

FRENDA
Enzyme name + organism

AMENDA
Enzyme name + organism + occurence

DRENDA
Disease-related enzyme data

KENDA
Kinetic data

Manual annotation

IUBMB enzyme classes

Literature

PubMed

Literature annotation

External databases und ontologies

UniProt, RCSB PDB PROTEIN DATA BANK, NCBI, MetaCyc, ChEBI, KEGG Kyoto Encyclopedia of Genes and Genomes, EMBL, Taxonomy Browser

BRENDA

BTO
Tissue Ontology

BRENDA