CRISPR PATENT LANDSCAPE

April 2015

IPStudies

Intangible assets deserve closer scrutiny

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Our team

Corinne LE BUHAN, PhD

ICT Expert

IP Strategy & Management

- Funded IPStudies in 2010 to help Swiss & EU high-tech SMEs develop and execute their IP valuation plans
- 12+ years experience in IP strategy and management –former VP Knowledge Management of Nagravision-Kudelski Group, in charge with patents (200 families), standards, R&D collaborations, licensing and technical publications portfolios
- Teaches international licensing practices and IP strategy at IEEPI Paris & Bern – Advices EU Horizon2020 on Innovation in SMEs
- Patent licensing sales and marketing partner, ICT sector, for Florenus in Berlin - ICT Technology Expert for various licensing facilitators and aggregators in France and the US
- University postgrade in management of innovation and intellectual property (University of Strasbourg, 2008), PhD in Communications Science (EPFL, 1998), MsC in Electrical Engineering (INSA Rennes, 1994)
- Experienced with Patbase, EPO/RegisterPlus, USPTO/PAIR
- International network of IP practitioners and licensing managers - Member LES, IEEE, AROPI, AAIEEPI

Fabien PALAZZOLI, PhD

Life Sciences Expert

Patent Analysis & Landscapes

- Joined IPStudies in 2013 to develop the IP analytics offering in life sciences & biotechnology
- 7+ years experience in technology transfers, patent mapping/ landscaping and FTO-driven research intelligence for the French public sector and biotech SMEs - former IP analytics sales manager for FIST SA, the CNRS technology transfer office
- Author/co-author of 18 scientific and technical publications/ communications, as well as one book chapter
- Life sciences patent analyst for various biotech/medtech SMEs in Switzerland and in Europe
- PhD in Life Sciences (Exploitation of patent information in a public research laboratory: identification of technological niches in bioproduction and gene therapy, University of Tours, 2011), MsC in Biotechnology and Law (University of Tours, 2007)
- Experienced with Orbit, Patbase, Intellixir, patent offices databases
- International network of patent information analysts

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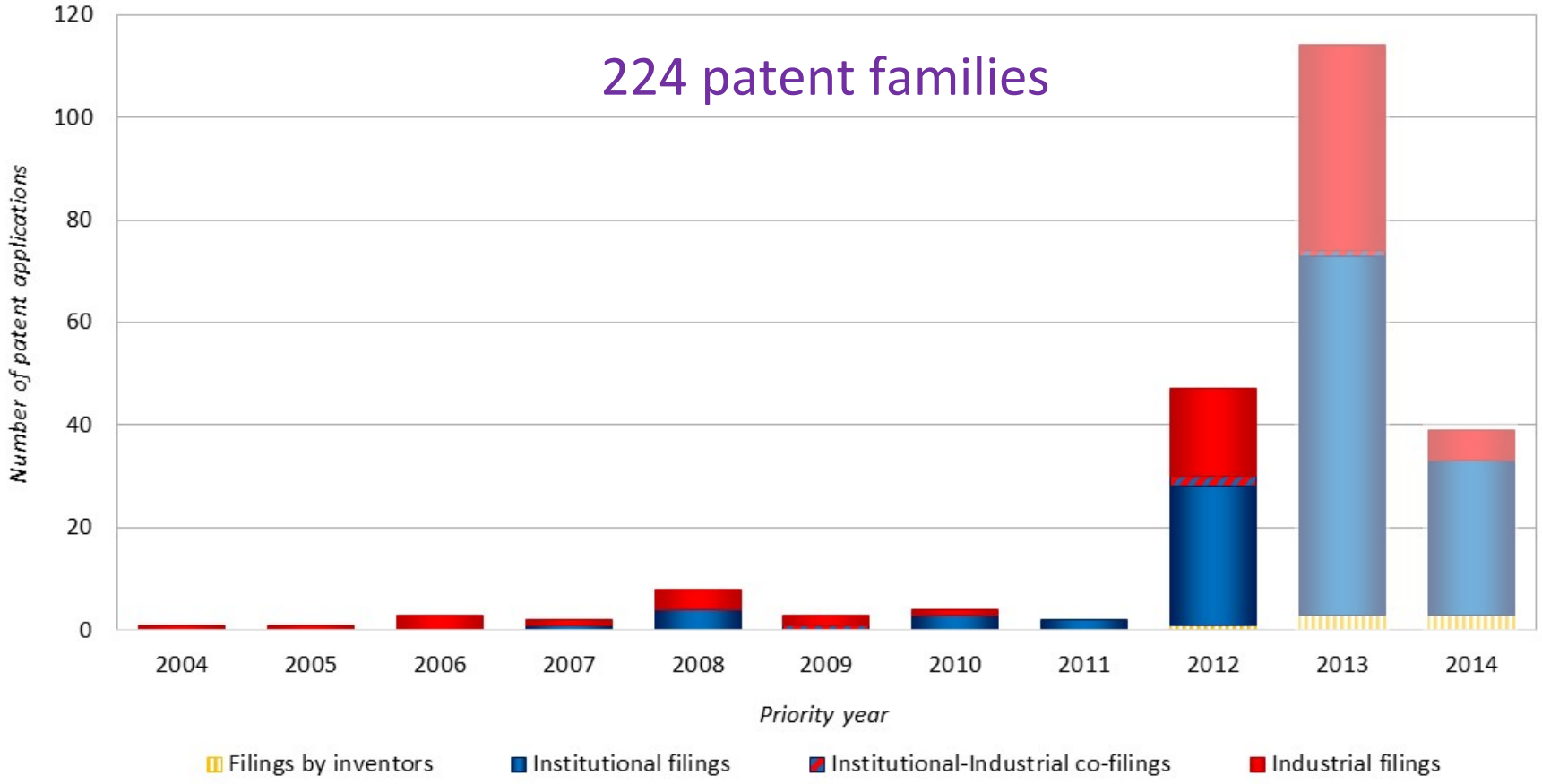
Temporal distribution of patent filings by type of applicants
(2004-2014)



- 137 filings by institutional applicants (61.2%).
- 76 filings by industrial applicants (33.9%).
- 7 filings by individual inventors (3.1%).
- 4 co-filings between industrial applicants and institutional applicants (1.8%).
- The years 2013 and 2014 are not complete due to the delay of publication of 18 months.

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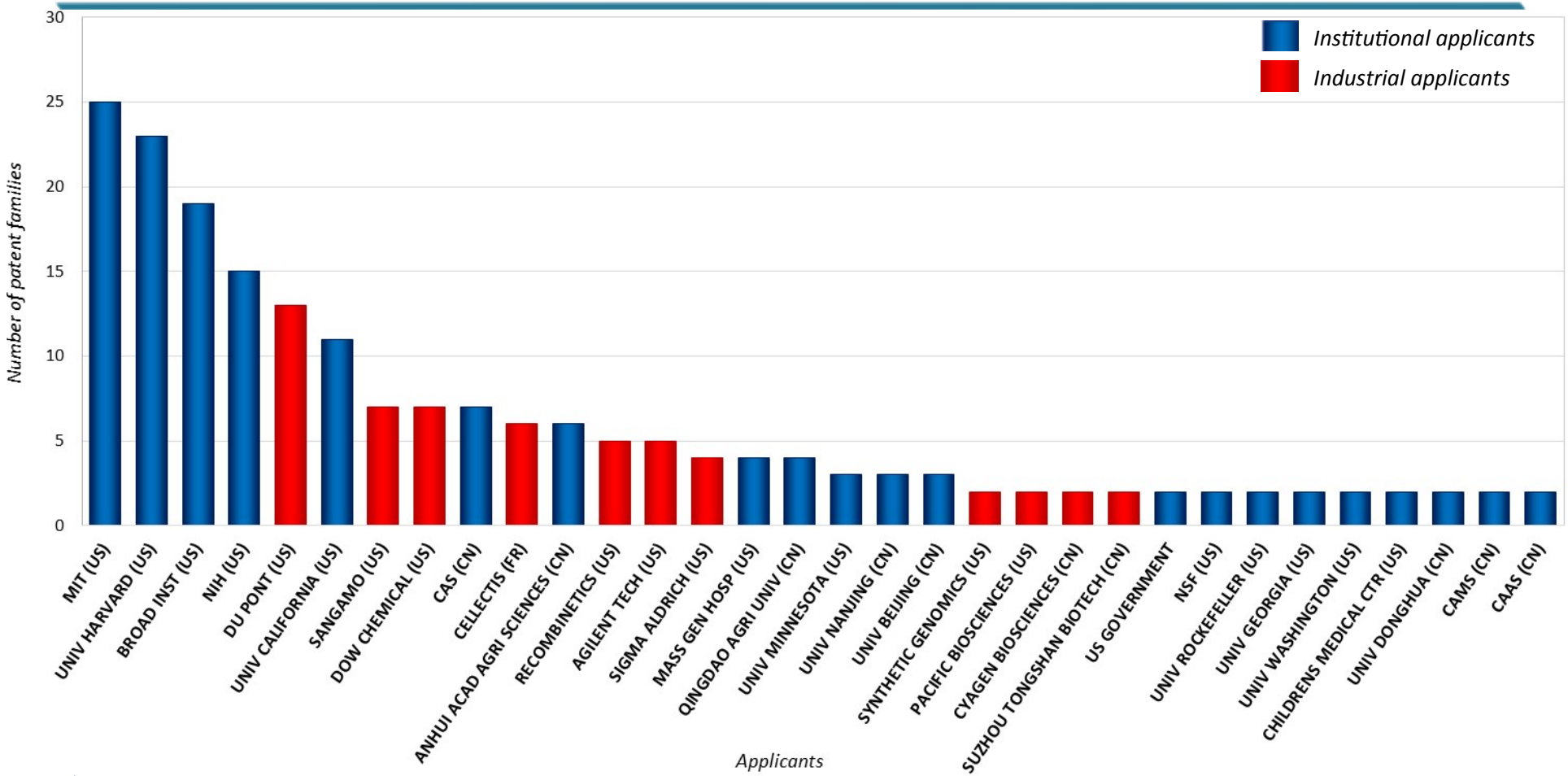
Main patent applicants (≥ 2 patent families)



- Affiliates & subsidiaries have been gathered under their parent company (Danisco with DuPont…). Co-filings are counted for each co-owner: a patent application co-filed between the MIT, the Harvard University and the Broad Institute is counted once for each of this applicant.
- Within the 32 main applicants, 21 are institutional applicants and 11 are industrial applicants.
- The patent portfolio of DuPont comprises historical patent families on CRISPR sequences dealing with the typing of bacterial strains, cultures with improved phage resistance and applications for preparing food.

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Breakdown of the CRISPR patent database

The 224 patent families have been manually classified

CLAIM COVERAGE OF PATENT FAMILIES

Applications

- Genome editing with EN
- Modulation of gene expression
- NAi-like system
- Therapeutic application
- Bioproduction
- Other application

Cells and organisms

- Human cell
- Mammalian cell
- Mammal
- Other animal cell
- Other animal
- Plant cell
- Plant
- Fungi-algae-yeast
- Other organism
- Eukaryotic cell
- Prokaryotic cell
- Undefined cell
- Undefined organism

Molecular tools

- TAL Effectors
- NA-targeting RNA
- TALEN
- CRISPR-assoc. protein
- CRISPR-Cas system
- Nuclease
- ZF Nuclease
- Meganuclease
- Chimeric TF
- Other chimeric protein
- Vector
- CRISPR sequence

COMPONENTS

DNA-Binding Domains

- ZF Domains
- DBD from meganuclease
- TAL Effectors
- NA-targeting RNA
- Other DBD
- Undefined DBD

Catalytic domains

- Nuclease
- Meganuclease
- CRISPR-assoc. protein
- Recombinase
- Integrase
- Repressor-Activator
- Methyltransferase
- Demethylase
- Acetyltransferase
- Deacetylase
- Kinase
- Other catalytic domain
- Undefined catalytic domain

CHIMERIC PROTEINS

Chimeric nucleases

- ZF Nuclease
- Meganuclease
- TALE Nuclease
- RNA-Guided Nuclease
- Other chimeric nuclease
- Undefined nuclease

Other chimeric proteins

➢ **A patent family can be classified in several categories (e.g. “Genome Editing with EN" and "Therapeutic application“ and “Human cell“ and “CRISPR-Cas system“ …).**

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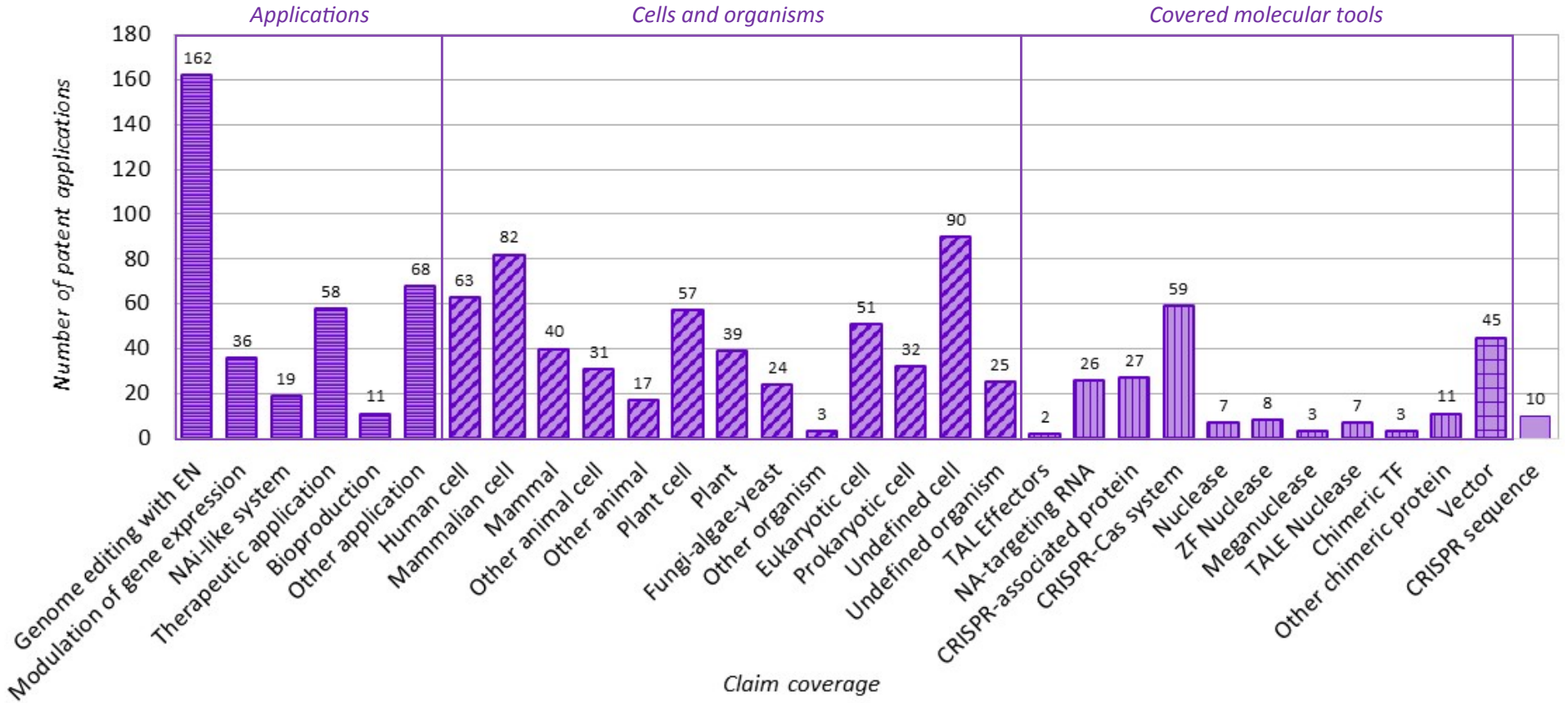
Breakdown by Claim coverage of patent families
Breakdown of the patent portfolio



EN = Engineered Nucleases

NA-targeting RNA = Nucleic Acid-targeting RNA, guide RNA…

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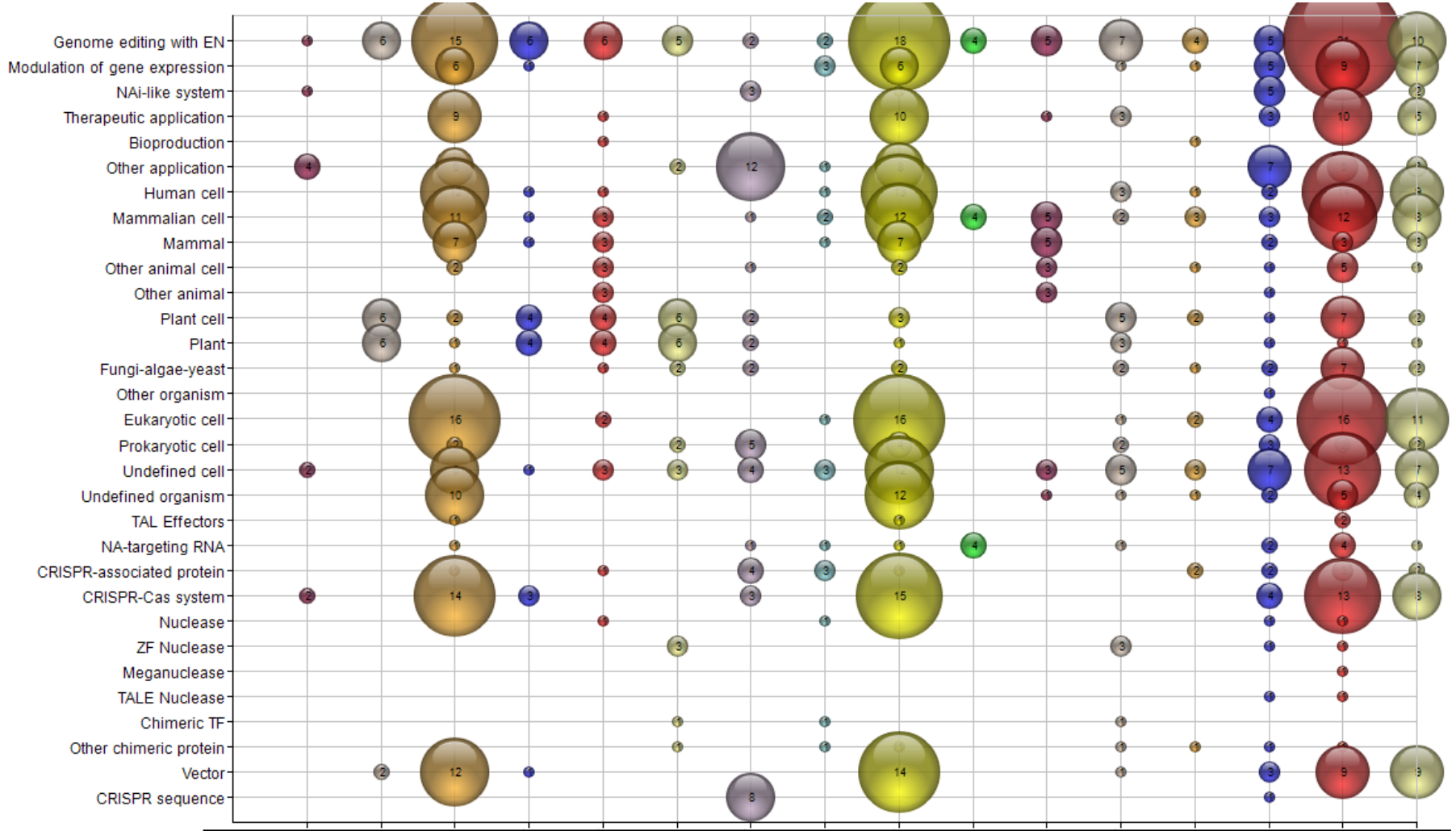
Breakdown by Claim coverage of patent families

Positioning of the main applicants (1) (≥ 4 patent families)



Applicants with at least 4 patent families in their patent portfolio

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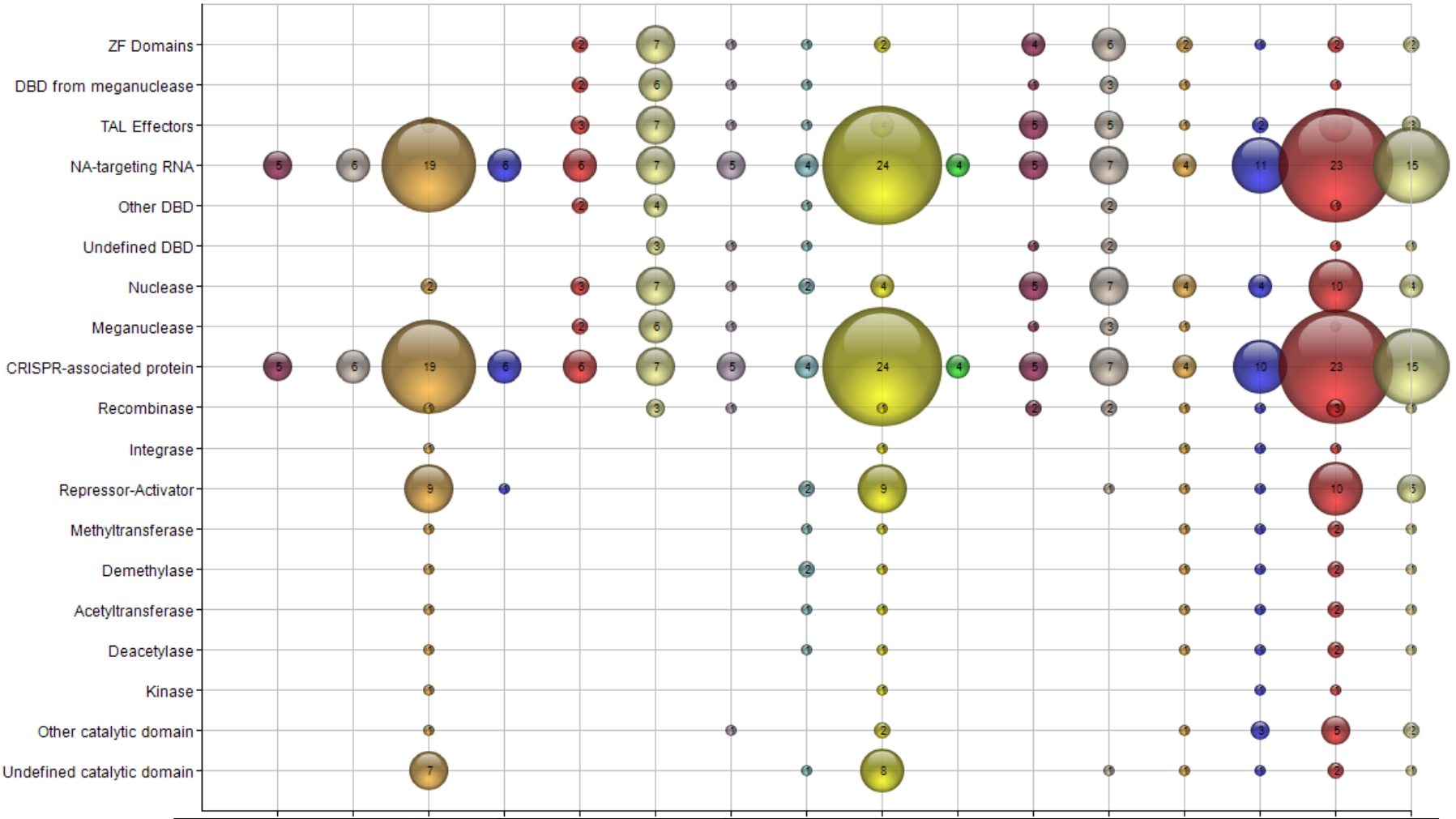
Breakdown by Components

Positioning of the main applicants (1) (≥ 4 patent families)



Applicants with at least 4 patent families in their patent portfolio

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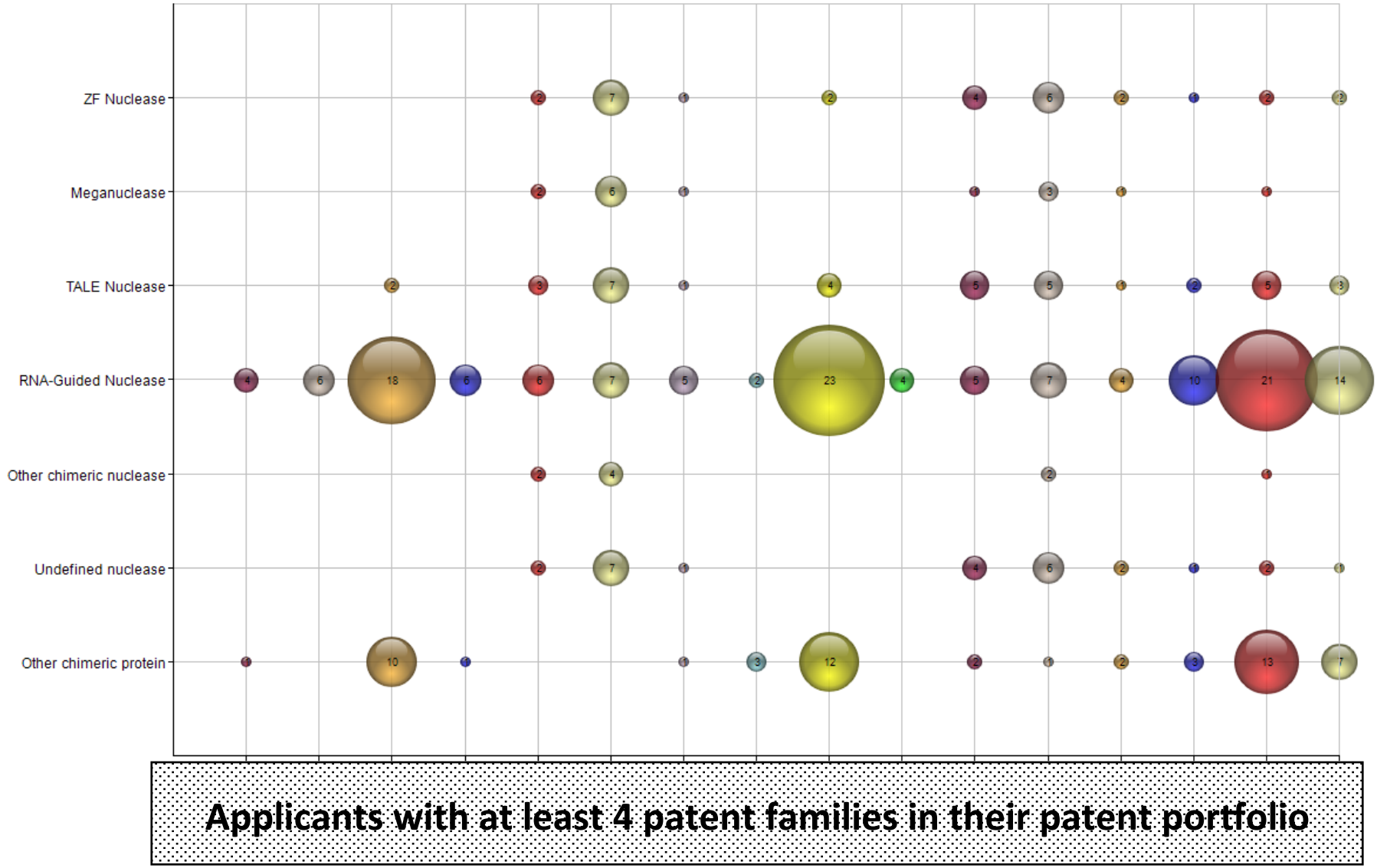
Breakdown by Chimeric proteins

Positioning of the main applicants (1) (≥ 4 patent families)



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Further analysis

- Patent portfolios of specific applicants
- Patents filed in a country (US…) or a region (EP…), for a defined period
- Patents covering a application, a technology, or a specification defined by/with the customer
- Legal status of relevant patents; claim coverage prosecution monitoring
- Zoom on dedicated technology or functional subsets
- …

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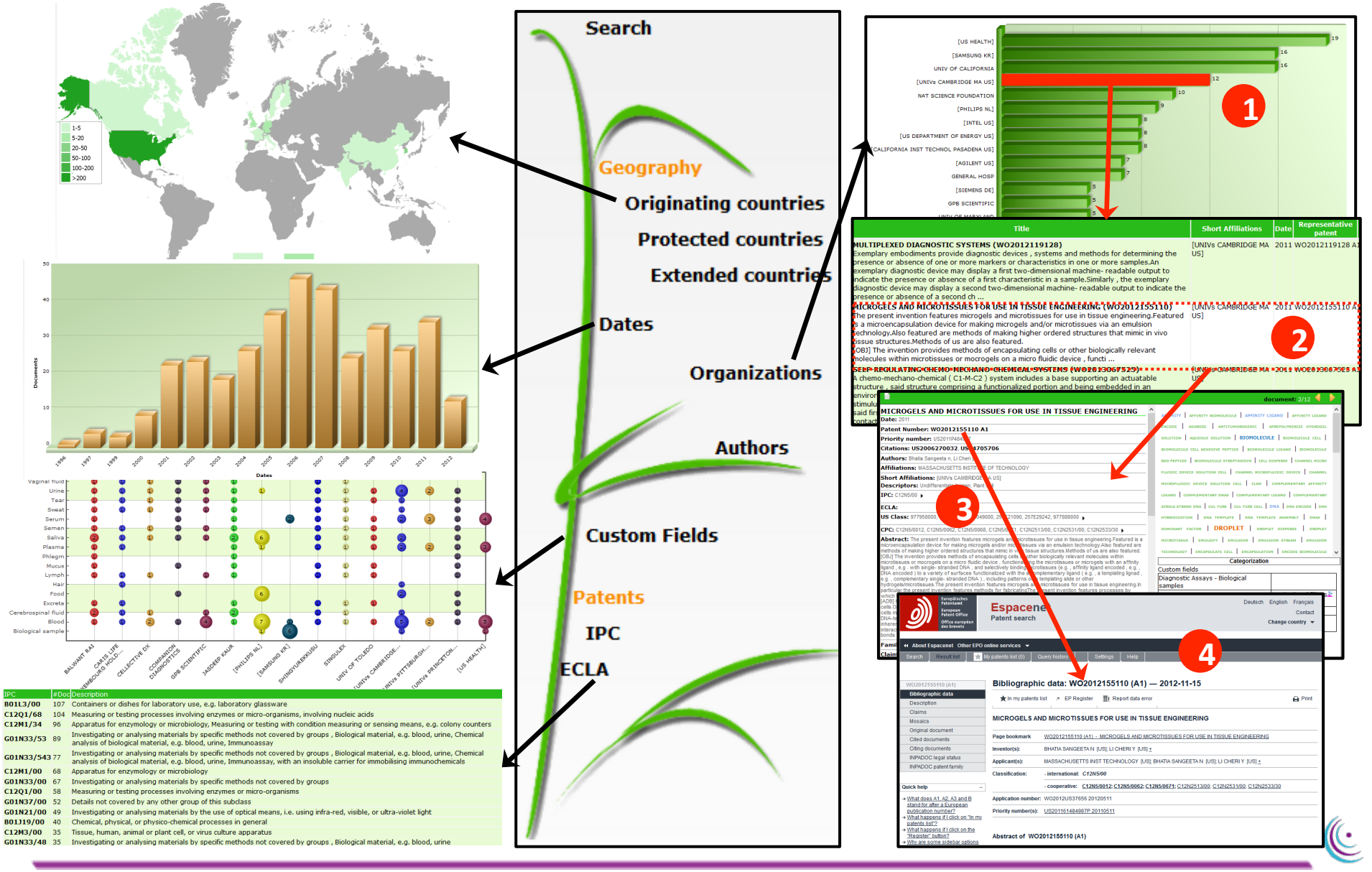
Access to the interactive and dynamic patent database



IPC	#Doc	Description
B01L3/00	107	Containers or dishes for laboratory use, e.g. laboratory glassware
C12Q1/68	104	Measuring or testing processes involving enzymes or micro-organisms, involving nucleic acids
C12M1/34	96	Apparatus for enzymology or microbiology, Measuring or testing with condition measuring or sensing means, e.g. colony counters
G01N33/53	89	Investigating or analysing materials by specific methods not covered by groups , Biological material, e.g. blood, urine, Chemical analysis of biological material, e.g. blood, urine, Immunoassay
G01N33/543	77	Investigating or analysing materials by specific methods not covered by groups , Biological material, e.g. blood, urine, Chemical analysis of biological material, e.g. blood, urine, Immunoassay, with an insoluble carrier for immobilising immunochemicals
C12M1/00	68	Apparatus for enzymology or microbiology
G01N33/00	67	Investigating or analysing materials by specific methods not covered by groups
C12Q1/00	58	Measuring or testing processes involving enzymes or micro-organisms
G01N37/00	52	Details not covered by any other group of this subclass
G01N21/00	49	Investigating or analysing materials by the use of optical means, i.e. using infra-red, visible, or ultra-violet light
B01J19/00	40	Chemical, physical, or physico-chemical processes in general
C12M3/00	35	Tissue, human, animal or plant cell, or virus culture apparatus
G01N33/48	35	Investigating or analysing materials by specific methods not covered by groups , Biological material, e.g. blood, urine

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This is only a sample report with partial data. Our full offer includes:

- an **analysis of the patent landscape**, covering 224 patent families, worldwide
- a **synthesis of IP strategy findings**, to visualize key trends in terms of patent applicants, collaboration networks, competitor technology positioning, key inventors and R&D white spaces out of the landscape
- an **on-line access to the selected patent set**, so you can visualize, navigate, focus and extract the most relevant patent data according to your specific needs.

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