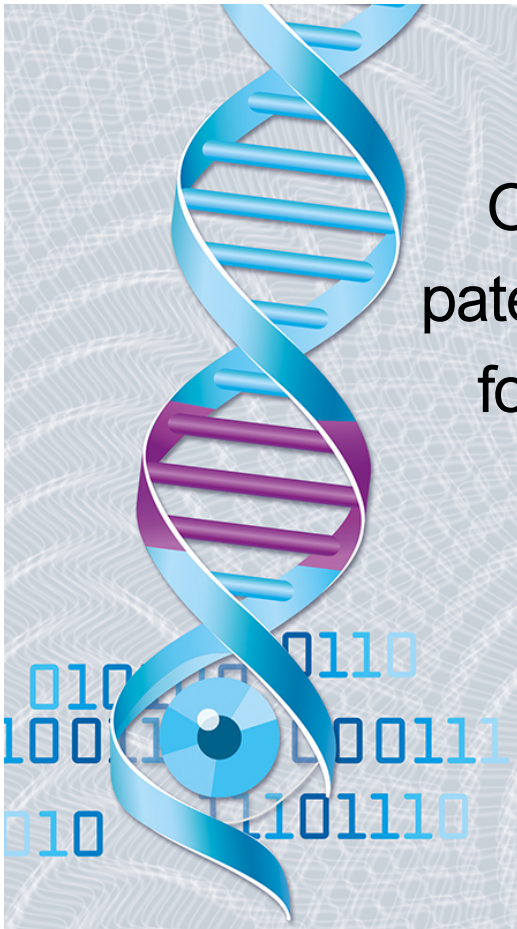


On the relevance of deeper patent office register information for reporting to C-levels and investors

Biotech case studies

Dr. Corinne Le Buhan

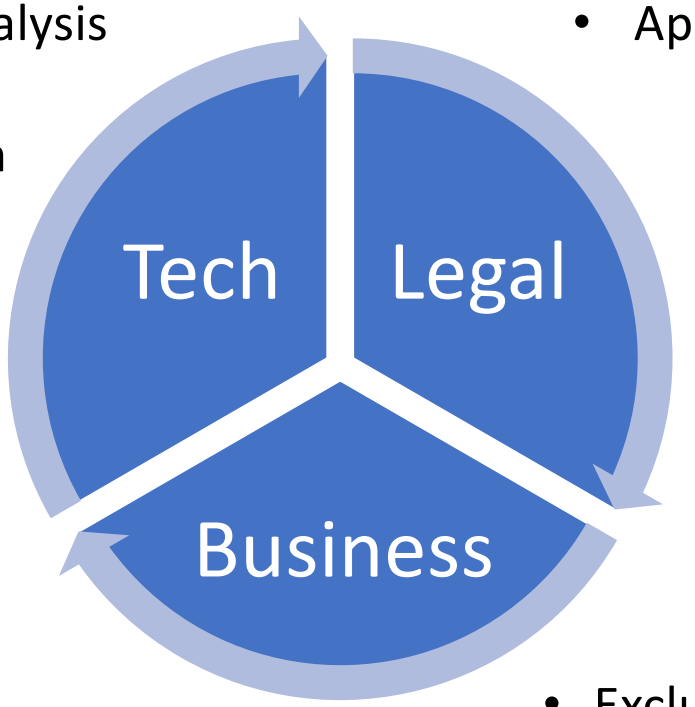
CEPIUG 10th anniversary
Milano, Italy, September 2018

Intangible assets deserve closer scrutiny

IPStudies

Patent information for IP strategy

- Semantic analysis
- Citations
- Classification
- Inventors
- Divisionals



- Application status
- Countries
- Timeline

- Exclusive licensing
- Assignments
- Oppositions, PTAB re-exams/Inter Parte Reviews
- Litigation

IPStudies

My history of PIU for C-levels & investors

2001-2006: Tech expert for Kudelski C-level competition watch & M&A

- Patent publications from online WIPO & EP registers
  => **professional database subscriptions**

2007-2010: IP management & strategy for the Kudelski group

- Strategies at different product lifecycles, with patent information metrics
- Manual count for quantitative trends landscaping in MS-Office
  => **patent analytics s/w additions in the 2010s**

2010-2017: IPStudies patent analytics for licensing programs (ICT & Biotech)

- Claim mapping out of 10000+ under-licensed patents in smartphones
- Preliminary FTO analysis on 20000+ biotech patent families yearly
- Manual retrieval of individual continuation/continuation in part members latest claim status in US PAIR
  ⇒ **patent analytics legal prosecution mining**

2014-2018: Worldwide provider of CRISPR gene editing patent analytics

- Intense patent & licensing wars by IP strategists in the biotech world started long before patent granting
  => WE NEED MORE ADVANCED PATENT ANALYTICS TOOLS
  FOR COMPETITIVE INTELLIGENCE IN EARLY PROSECUTION STAGE

IPStudies

CRISPR – Revolutionary biotechnology

www.wipo.int/wipo_magazine/en/2017/02/article_0005.html

WIPO | MAGAZINE

The battle to own the CRISPR–Cas9 gene-editing tool

April 2017

*By **Catherine Jewell**, Communications Division, WIPO, and **Vijay Shankar Balakrishnan**, Science and Health Journalist*

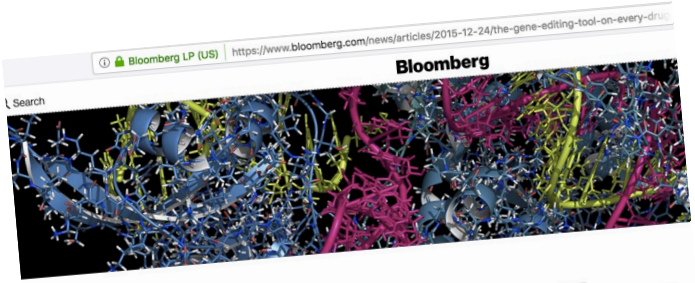
Millions suffer from devastating genetic disorders like cancer, muscular dystrophy, cystic fibrosis, sickle cell anaemia, Huntington's disease and many others. Imagine the pain and suffering that could be avoided (not to mention the healthcare costs) if we could cure these diseases simply by rewriting the genetic code of patients. This is the promise of the CRISPR-Cas9 gene-editing technology.

IPStudies

CRISPR patent competition – Media coverage

Most media, C-levels, and investors, focus on the two main academic pioneers and competing licensors

- The Broad Institute (Harvard MIT)
- Uni California Berkeley (+Charpentier)



Business

The Gene-Editing Tool on Every Drugmaker's Wish List This Year

By Caroline Chen and Doni Bloomfield
December 24, 2015, 6:01 AM GMT+1

- Crispr-Cas9 draws investments from Vertex, Bayer, Novartis
- Patent fight, regulation may restrain still-unproven tool

In a single year, Rodger Novak's gene-editing startup raised $89 million in venture funding, got $105 million to enter a partnership with big drugmaker Vertex Pharmaceuticals Inc. -- and, this week, announced a deal with Bayer AG worth $335 million.

Business

This Court Battle Will Decide Who Will Make a Fortune From Gene-Editing Tech

By Susan Decker and Michelle Cortez
April 29, 2018, 2:00 PM GMT+2 *Updated on April 30, 2018, 2:56 PM GMT+2*

- Institutes fight over CRISPR, the 'discovery of the Century'
- Victory could determine who gets paid for revolutionary idea

nature International weekly journal of science

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News & Comment › News › 2018 › August › Article

NATURE | NEWS

Why the CRISPR patent verdict isn't the end of the story

From legal challenges to ongoing experimentation, the story of who owns the rights to CRISPR–Cas9 gene editing is still being written.

Heidi Ledford

17 February 2017

Rights & Permissions

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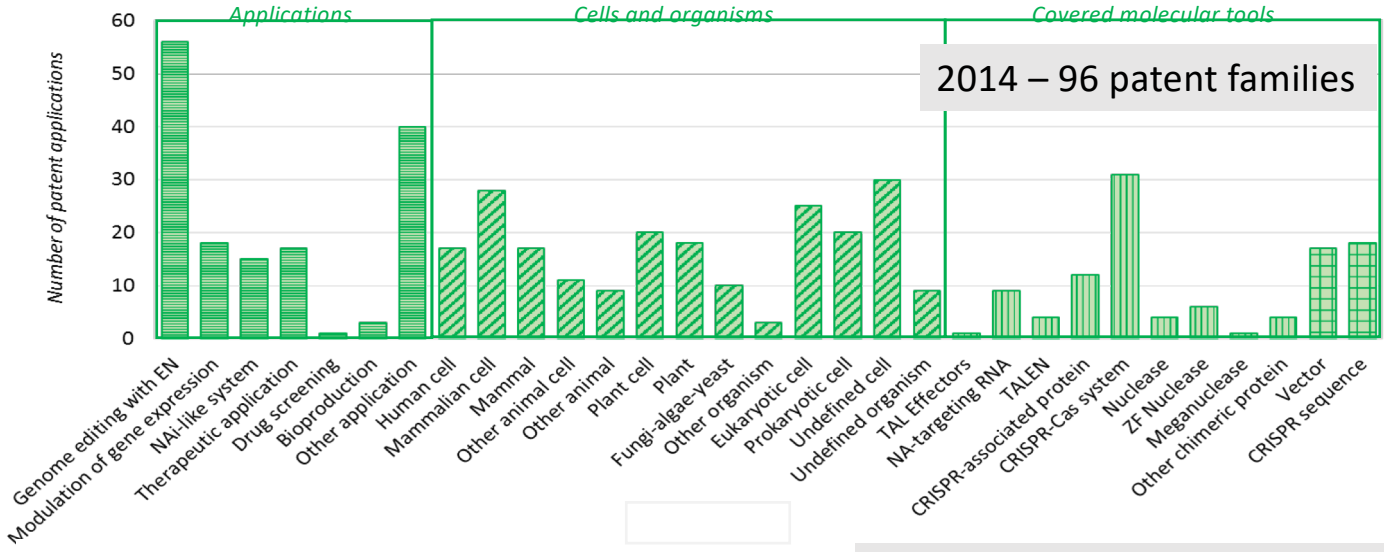
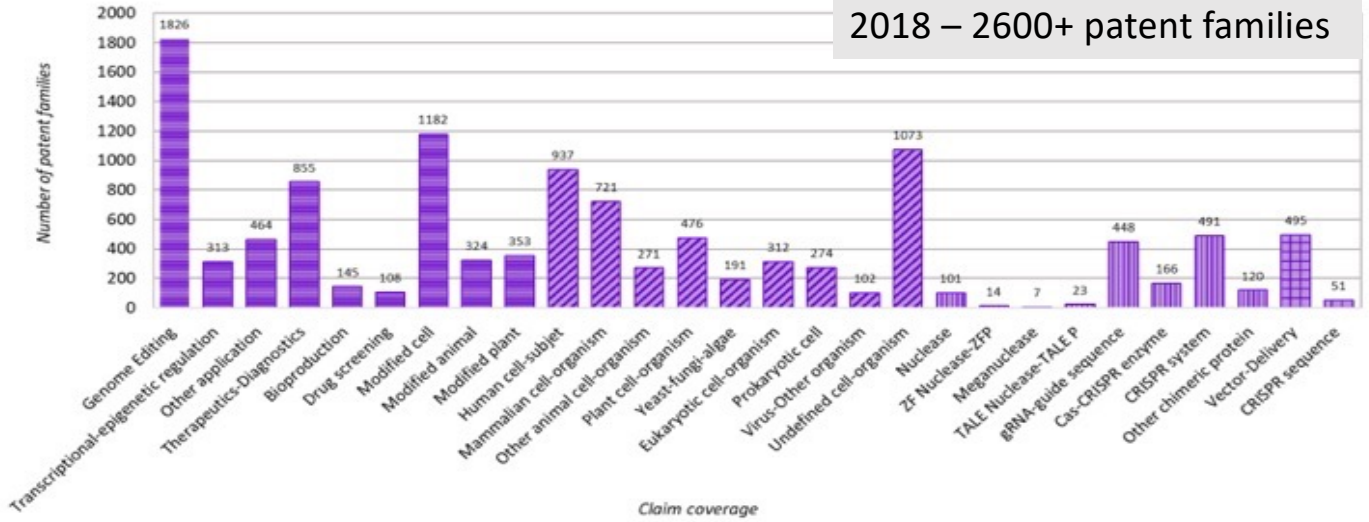
CRISPR patent competition – Landscape view





IPStudies

Case study #1 - Deeper register information: Inventors

IP management practices – Co-inventors with different interests

Another outstanding pattern out of the CRISPR patent landscape is the complexity of inventorship and invention assignment tracking. The initial discoveries were conducted by multiple international teams; sometimes on their own, sometimes out of a formal collaborative research agreement, sometimes out of less formalized scientific research collaboration. This is again reflected in the resulting patent prosecution histories.

Continue reading →

December 2, 2014 Corinne LE BUHAN Comments are off for this post.

2014 – Deeper register information reveals conflicts of interests between inventors (and/or applicants)

2018 – The first granted pioneering CRISPR granted patent in Europe is revoked due to conflict of inventorship between the priority document and the EP filing

www.bioworld.com/content/european-patent-office-revokes-broad-institute-crispr-patent-0

BioWorld

Actionable Intelligence • Incisive Analysis

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European Patent Office revokes Broad Institute CRISPR patent

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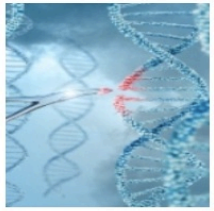

By Cormac Sheridan
Staff Writer

DUBLIN – The epic CRISPR/Cas9 patent wars took another intriguing twist this week, when the European Patent Office (EPO) revoked a Broad Institute European patent, EP 2771468 B1, on the basis that it lacked priority over novel art. The Broad Institute, of Cambridge, Mass., immediately stated its intention to appeal the decision, which imposes a stay of execution on the EPO decision.

The patent, known in other jurisdictions as US 20140242664 A1 and WO 2014093712 A1, among other designations, is titled "Engineering of systems, methods and optimized guide compositions for sequence manipulation," and claimed a priority date of Dec. 12, 2012. It is one of the foundational patents claimed by the Broad Institute, based on Feng Zhang's work in translating the CRISPR/Cas9 genome editing tools to a eukaryotic background.

It was overturned on a technicality, based on the omission of Luciano Marraffini of the Rockefeller University in New York, who was originally named as co-inventor on earlier filings but omitted from later filings following the emergence of an IP dispute – since settled – between the two institutions.

IPStudies

Registers: inventor data of strategic interest

- Early evidence of conflict of interest between Berkeley/Doudna and Charpentier
- Resulted in two competing companies
- Filed Jun 2013 - Data visible in PAIR: Nov 2013

CRISPR THERAPEUTICS

Founded Oct 2013

Intellia THERAPEUTICS

Founded May 2014

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Doudna *et al* CONFIRMATION NO.: 8182

APPLICATION NO.: 13/842,859 ART UNIT: 1653

FILING DATE: March 15, 2013 EXAMINER: Not yet assigned

TITLE: Methods and Compositions for RNA-Directed Target DNA Modification and For RNA-Directed Modulation of Transcription

Filed via EFS-Web

PETITION UNDER 37 C.F.R. § 1.183 TO SUSPEND THE RULES IN ORDER TO PERMIT JOINT REPRESENTATION IN A PATENT APPLICATION

This is a petition under 37 C.F.R. § 1.183 to suspend the requirement of 37 C.F.R. § 1.32(b)(4) that the applicant sign the power of attorney.

Emmanuelle Charpentier is one of seven named inventors on this application and is an applicant on this application. (See Exhibit A, Filing Receipt). This petition is filed on behalf of Ms. Charpentier to request that the U.S. Patent and Trademark Office (USPTO) accept the attached power of attorney appointing her own representative to prosecute this application before the USPTO, separate and apart from any representative(s) appointed by the remaining six inventors or their assignees.

Ms. Charpentier submits that this is an extraordinary situation where justice requires waiver of the requirement of 37 C.F.R. § 1.32(b)(4) that the applicant sign the power of attorney because Ms. Charpentier's interest in the application is materially different from the interests of the remaining inventors.

IPStudies

Registers: inventor data of strategic interest

source Patbase - only EP, US, WIPO shown

Bibliographic data: WO2013141680 (A1) — 2013-09-26

In my patents list | EP Register | Report data error

RNA-DIRECTED DNA CLEAVAGE BY THE Cas9-crRNA COMPLEX

Page bookmark	WO2013141680 (A1) - RNA-DIRECTED DNA CLEAVAGE BY THE Cas9-crRNA COMP
Inventor(s):	SIKSNYS VIRGINIJUS [LT]; GASIUNAS GIEDRIUS [LT]; KARVELIS TAUTVYDAS [LT]
Applicant(s):	UNIV VILNIUS [LT] + (VILNIUS UNIVERSITY)
Classification:	- international: *C12N15/10; C12N15/113*
	- cooperative: **C12N15/102**; **C12N15/111**; **C12N15/63**; C12N2310/11; C12N2310/3519
Application number:	WO2013LT00006 20130315 Global Dossier
Priority number(s):	US201261625420P 20120417 ; US20120613373P 20120320

Bibliographic data: WO2013142578 (A1) — 2013-09-26

In my patents list | EP Register | Report data error | Print

RNA-DIRECTED DNA CLEAVAGE BY THE Cas9-crRNA COMPLEX

Page bookmark	WO2013142578 (A1) - RNA-DIRECTED DNA CLEAVAGE BY THE Cas9-crRNA COMPLEX
Inventor(s):	SIKSNYS VIRGINIJUS [LT]; GASIUNAS GIEDRIUS [LT]; KARVELIS TAUTVYDAS [LT]; LUBYS ARVYDAS [LT]; ZALIAUSKIENE LOLITA [LT]; GLEMZAITE MONIKA [LT]; SMITH ANJA [US] +
Applicant(s):	UNIV VILNIUS [LT]; SIKSNYS VIRGINIJUS [LT]; GASIUNAS GIEDRIUS [LT]; KARVELIS TAUTVYDAS [LT]; LUBYS ARVYDAS [LT]; ZALIAUSKIENE LOLITA [LT]; GLEMZAITE MONIKA [LT]; SMITH ANJA [US] + (VILNIUS UNIVERSITY, ; SIKSNYS, VIRGINIJUS, ; GASIUNAS, GIEDRIUS, ; KARVELIS, TAUTVYDAS, ; LUBYS, ARVYDAS, ; ZALIAUSKIENE, LOLITA, ; GLEMZAITE, MONIKA, ; SMITH, ANJA)
Classification:	- international: *C12N15/10; C12N15/113*
	- cooperative: **C12N15/102**; **C12N15/113**; **C12N15/902**; **C12N15/907**; **C12N9/22**; **C12P19/34**; **C12Q1/6811**; C12N2310/12; C12N2310/14; C12N2310/20; C12N2310/3513; C12N2310/531; C12N2320/00; C12N2800/80 → more
Application number:	WO2013US33106 20130320 Global Dossier
Priority number(s):	US201261613373P 20120320 ; US201261625420P 20120417

IPStudies

Case study #2 - Deeper register information: Third Party Observations (TPO)

- Since 2011-2012 online (anonymous) Third Party Observations services at EPO, USPTO and WIPO as very efficient defensive IP tactical tool
  - **Anonymous** at EPO and WIPO
  - **No fees** due at EPO and WIPO
  - Can be filed **during examination**
  - Possible submission at WIPO between 18 months (publication) and 28 months (preparation of national phase entry at 30 months) is transmitted to offices: **"one file reaches all"**

- 2012-2017: 5 years WIPO TPO stats www.wipo.int/export/sites/www/pct/en/circulars/2018/1527.pdf
  - 1422 observations for 1394 int'l applications
  - 78% anonymous
  - 29% citing non patent literature
  - Advanced search on patentscope: "TPO:1"

  2% of the WIPO TPO since 2012 are CRISPR related!

IPStudies

www.wipo.int/export/sites/www/pct/en/circulars/2018/1527.pdf AND "TPO:1" ADVANCED SEARCH LANGUAGE IN PATENTSCOPE

Registers: TPO data of strategic interest

- Early evidence of fierce fights against CRISPR technology control in all offices
- Most pioneering CRISPR patents have been engaged into TPO battles 3-4 years before post-grant oppositions
- Hidden into the prosecution history data of individual members in EPO Register and USPTO PAIR

EP patent	EP TPOs	EP oppositions
Broad ‘468	2	9
Broad ‘162	-	8
Broad ‘103	17	7
Broad ’697	-	8
Broad ’898	1	6
Broad ’075	2	6
Broad’ 557	-	7
Berkeley	18	7
Vilnius	2	Still pending
Toolgen	5	Due 22.05.19
Sigma Aldrich	-	1

IPStudies

Case study #3 - Deeper register information: Citations

- Within a worldwide family, USPTO registers are the most complete records due to Information Disclosure Statement legal obligations, but…
  - Many US applicants disclose **large, noisy lists of prior art**
  - Mix of **academic and patent** literature
  - Identification of US examination citations (‘*’) only available in granted publication
  - No historical track record of citations along PAIR documents

- A mini-landscape on TPO prior art citations is the most relevant part of the prior art landscape, because:
  - It has been selected by patent lawyers specifically against their claim reading on a competitor product or competing patent application
  - It evolves over time as an indicator of moving claim coverage and counter-actions

IPStudies

Registers: TPO citations of strategic interest

- Focus on the most relevant prior art
- Hidden into the prosecution history data of individual members in registers

EP patent	EP TPOs	TPO citations: PL + NPL	EPB citations: PL + NPL
Broad ‘468	2	1 + 5	3 + 18
Broad ‘103	17	…	
Broad ’898	1	3 + 1	33 + 219
Broad ’075	2	4 + 1	16 + 85
Berkeley	18	…	
Vilnius	2	6 + 2	5 + 5
Toolgen	5	…	

IPStudies

Conclusions

- Dozens of millions of IP investments by companies in a single year are only visible deeply in registers
- Patent analytics tools – data mining and visualization – have significantly progressed in the past decade, but we need more:
  - Search, aggregation and synthesis of IP wars data for early & continuous competitive intelligence
  - Qualitative rather than quantitative analytics

IPStudies

Q&A

More information and various media links covering the CRISPR patent stories:

www.ipstudies.ch

Contact for questions:
lebuhan@ipstudies.ch

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