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## Who is inventor, and who owns the patent?

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A banner for the 5th ForTra Workshop for Translational Research. The text is white and set against a background of a blue and pink abstract image that resembles a microscopic view of a cell or tissue. The text is arranged in two lines: "5th ForTra Workshop for" on the top line and "Translational Research" on the bottom line.

# 5th ForTra Workshop for Translational Research

Dr. Kirstin Schilling  
Managing Director Innovectis GmbH

12.07.2023

# Innovectis – Technologietransfergesellschaft der Goethe-Universität



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- For scientists ▾
- For companies ▾
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- R&D Projects
- Technologies



## INNOVECTIS

INNOVECTIS is the technology transfer company of Goethe University. We serve as an important link between academia and industry.

## Service for Entrepreneurs

[Goethe Unibator](#) offers support to students, personnel and Alumni starting up business.

## Service for Scientists

How can I protect and commercialize my research results? INNOVECTIS helps scientists with all questions concerning technology transfer.

## Service for Companies

INNOVECTIS provides access for companies to research results and cooperation opportunities with Goethe University.

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[Invention Disclosure](#)

[Software Disclosure](#)



# Real Property Rights

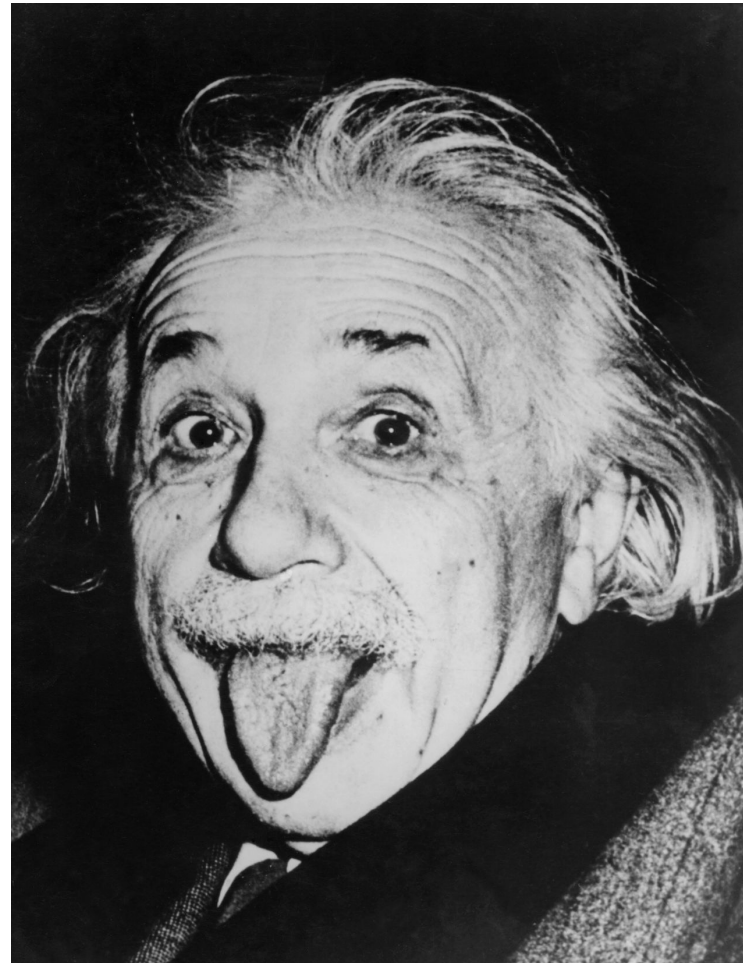
- Ownership
- Joint ownership
- Right to use (right of way)



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## Inventor

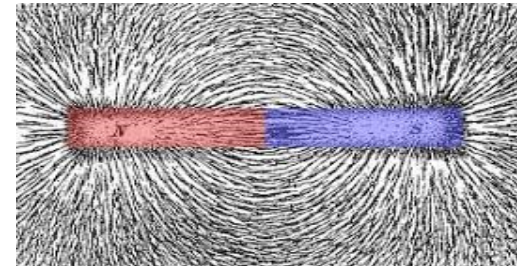
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## Patented Invention

### No Patent for:

- laws of nature (= discovery)
- physical phenomena
- abstract ideas



### Patent:

- protects an invention
- provides technical solution to a problem



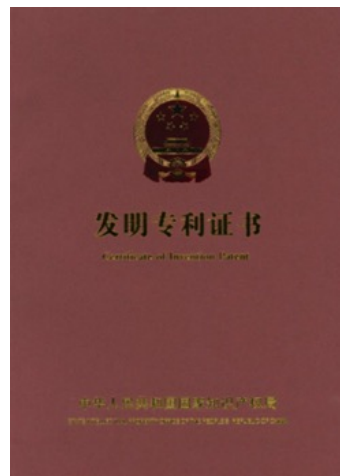
### Requirements for patent grant:

- novelty
- inventiveness
- industrial applicability



# Impact of a Patent

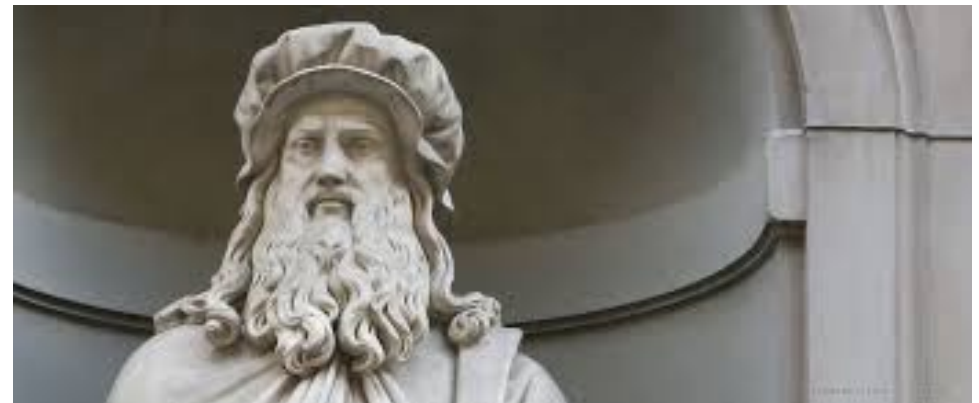
- exclusive right to prevent or exclude others from making, using, selling, offering to sell or importing the invention
- might be sold, licensed, abandoned or bequeathed
- limited in time and space



## Inventor Right


Article 60(1) EPC: "[t]he right to a European patent shall belong to the inventor or his successor in title"

- Personal Right
- Only for natural person
- Right to name inventor



Leonardo da Vinci

# Who owns a patent?

  
 US0106800B2

(12) **United States Patent**  
**Sahin et al.**

(10) Patent No.: **US 10,106,800 B2**  
 (45) Date of Patent: **Oct. 23, 2018**

(54) **MODIFICATION OF RNA, PRODUCING AN INCREASED TRANSCRIPT STABILITY AND TRANSLATION EFFICIENCY**

(71) Applicant: **BioNTech AG, Mainz (DE)**

(72) Inventors: **Ugur Sahin, Mainz (DE); Silke Holtkamp, Mainz (DE); Ozlem Tureci, Mainz (DE); Sebastian Kreiter, Mainz (DE)**

(73) Assignee: **BioNTech AG, Mainz (DE)**

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No. **15/217,555**

(22) Filed: **Jul. 22, 2016**

(65) **Prior Publication Data**  
 US 2017/0009244 A1 Jan. 12, 2017

**Related U.S. Application Data**

(62) Division of application No. 11/992,638, filed as application No. PCT/EP2006/09448 on Sep. 28, 2006, now Pat. No. 9,476,055.

(30) **Foreign Application Priority Data**  
 Sep. 28, 2005 (DE) ..... 10 2005 046 490

(51) **Int. Cl.**  
**C12N 15/00** (2006.01)  
**C12P 21/06** (2006.01)  
**C12N 15/68** (2006.01)  
**C12N 15/67** (2006.01)  
**C12N 15/85** (2006.01)

(52) **U.S. Cl.**  
 CPC ..... **C12N 15/68** (2013.01); **C12N 15/67** (2013.01); **C12N 15/85** (2013.01)

(58) **Field of Classification Search**  
 CPC ..... C12N 15/68  
 See application file for complete search history.

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EP	2506633 A2	3/2013
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Tangany et al in "Translational efficiency is regulated by the length of the 5' untranslated region" (Molecular and Cellular Biology, vol. 16, No. 1, 1996, pp. 146-156).\*

International Preliminary Report on Patentability Chapter 1, dated Apr. 1, 2008, Filed in relation to PCT Application No. PCT/EP2006/09448, Filed Apr. 5, 2007, Entitled "Modification of RNA, Producing an Increased Transcript Stability and Translation Efficiency," By Applicant "Johannes Gutenberg-Universität Mainz, Vertreten Durch Den Präsidenten," 9 pages.

International Search Report (ISR), dated May 8, 2007, Filed in relation to PCT Application No. PCT/EP2006/09448, Filed Apr. 5, 2007, Entitled "Modification of RNA, Producing an Increased Transcript Stability and Translation Efficiency," By Applicant "Johannes Gutenberg-Universität Mainz, Vertreten Durch Den Präsidenten," 15 pages.

(Continued)

**Primary Examiner** — Catherine S Hibbert  
**(74) Attorney, Agent, or Firm** — Banner & Witcoff, Ltd.

(57) **ABSTRACT**

It was the object of the present invention to provide RNA with increased stability and translation efficiency and means for obtaining such RNA. It should be possible to obtain increased grades of expression by using said RNA in gene therapy approaches.

**11 Claims, 15 Drawing Sheets**  
 Specification includes a Sequence Listing.

(12) **United States Patent**  
**Sahin et al.**

(54) **MODIFICATION OF RNA, PRODUCING AN INCREASED TRANSCRIPT STABILITY AND TRANSLATION EFFICIENCY**

(71) Applicant: **BioNTech AG, Mainz (DE)**

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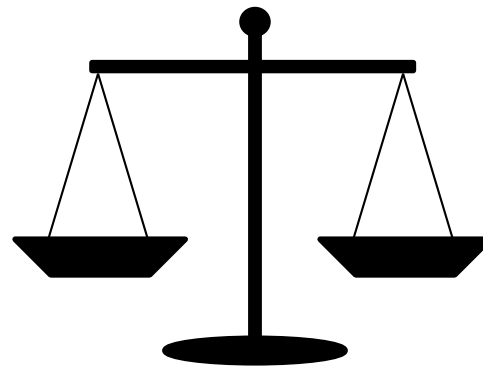


## German Employee Invention Act

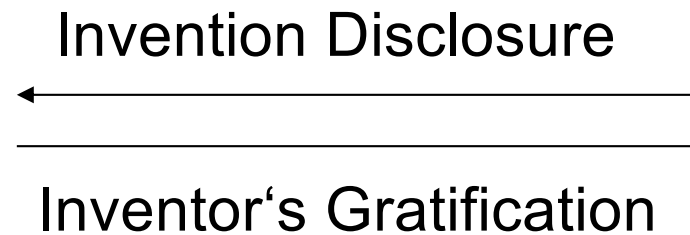
Labour Law

Employee Invention Act  
(ArbEG)

Patent Law



Employer



Employee

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## University Professor's Privilege

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### **Febr. 7th 2002: Abolition of the university professor privilege for employee inventions (Amendment of §42 ArbEG)**

- University inventor's must report inventions to university
- University decides within 4 months whether it wants to claim or to free the invention (2 months period in case of planned publication)
- University inventors gratification: 30 % of the income

## Who is Employee Inventor?

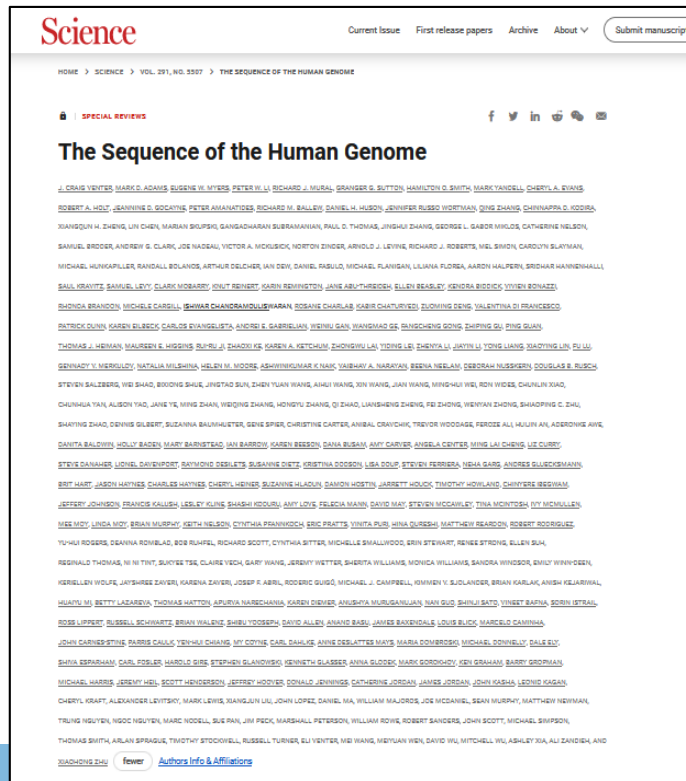
- ✓ Professor
- ✓ Postdoc
- ✓ PhD student
- ✓ Scientific staff
- ✓ Technician
- ✓ Technical assistant

- X Student
- X Scholarship recipient
- X Visiting scientist

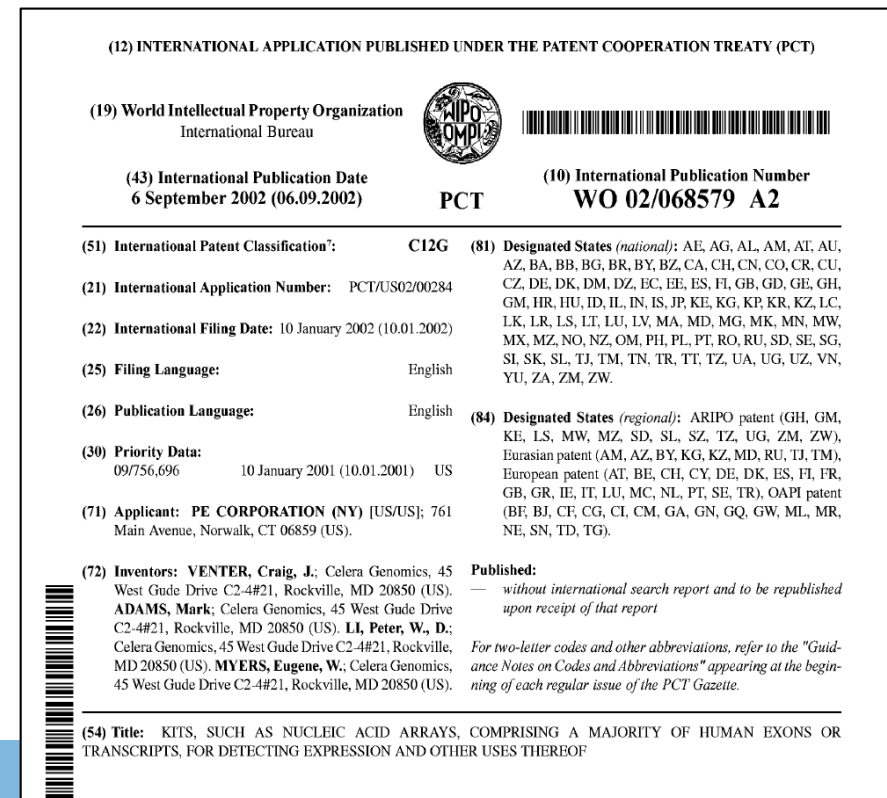


# Who is inventor?

**Publication:**  
 Craig Venter et al., Science 2001  
**274 authors**



**Patent application:**  
 „Kits ... comprising the majority of human exons ...“  
**4 inventors**



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## Who is inventor?

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✓ significant intellectual contributions to the conception and development of an invention

X Provider of money & infrastructure

X Support staff (technical assistance)

X Provider of known tools

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## Who owns CRISPR?

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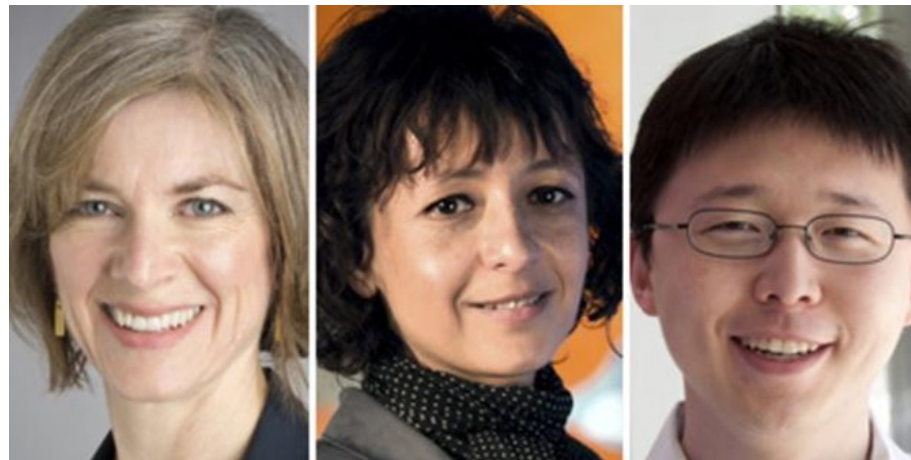
### **UC Berkeley**

Jennifer Doudna of the University of California, Berkeley, and  
Emmanuelle Charpentier, then of the **University of Vienna**

vs.

### **Broad Institute of MIT and Harvard**

Feng Zhang



## CRISPR/Cas – Gene editing tool



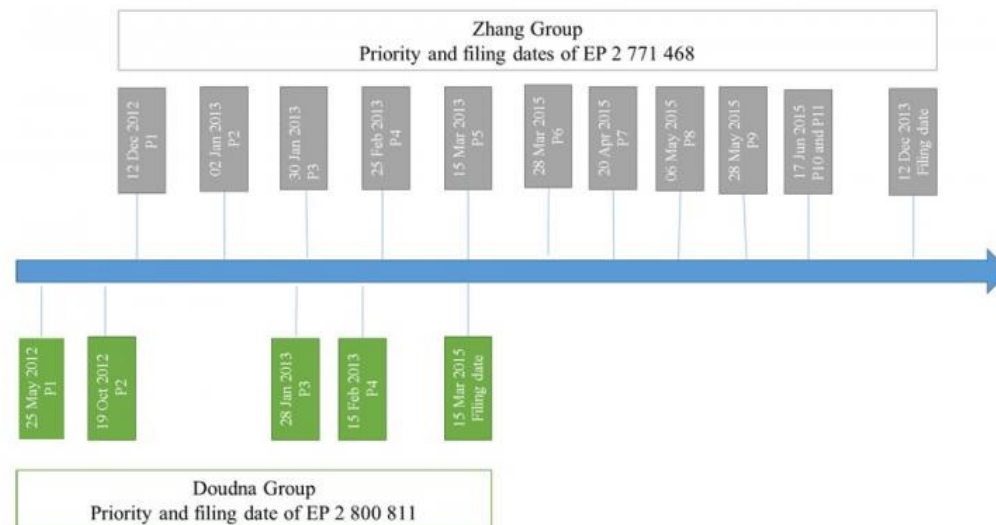
<https://www.seedworld.com/who-owns-crispr/>

# CRISPR Patenting

May 25, 2012: Berkeley et al. (Doudna group) file patent application reporting in vitro use of a single-molecule guide RNA in a CRISPR/Cas9 system for targeted DNA cleavage

December 2012: Broad (Zhang group) files patent application with experimental results showing that this CRISPR/Cas9 system can be used for targeted DNA modification in eukaryotic cells

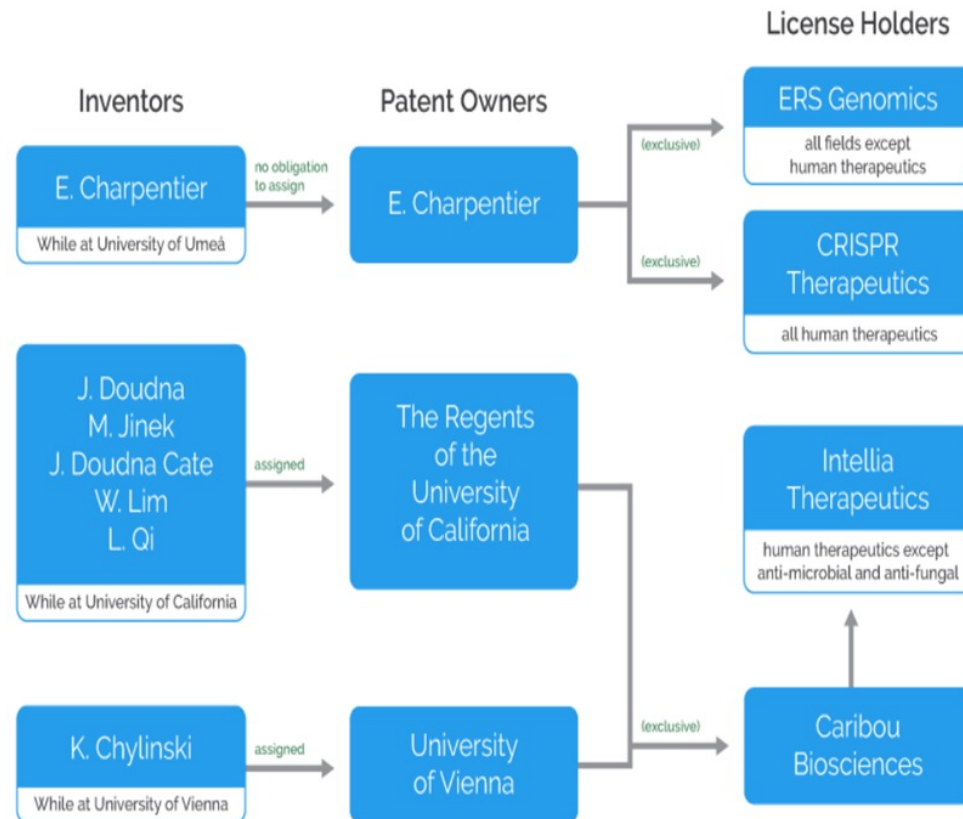
Figure 1: Timeline of filings by the Zhang and Doudna groups





# Tricky Inventor Situation

## Patent Inventors / Owners / Exclusive Licensees



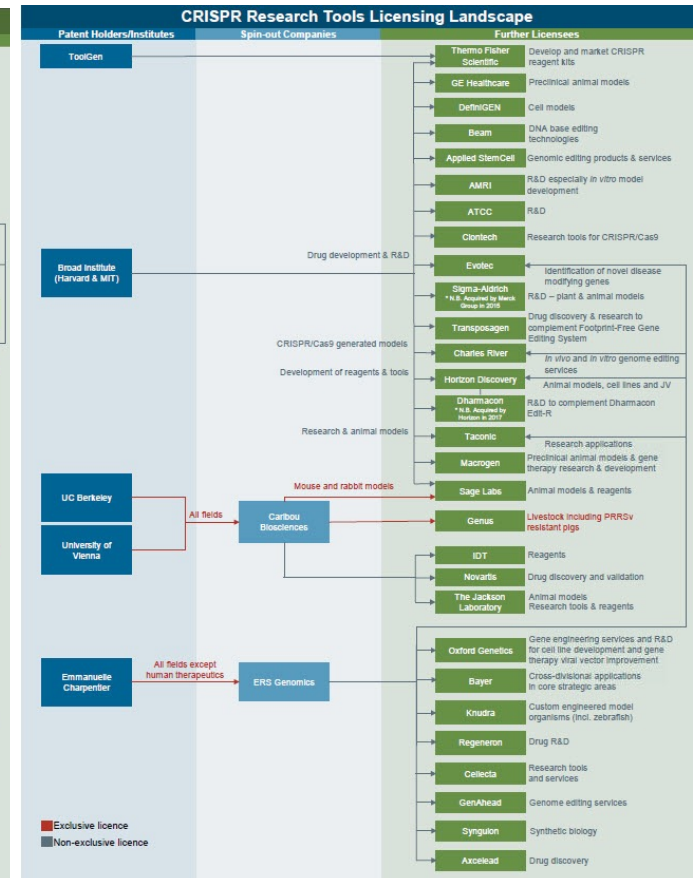
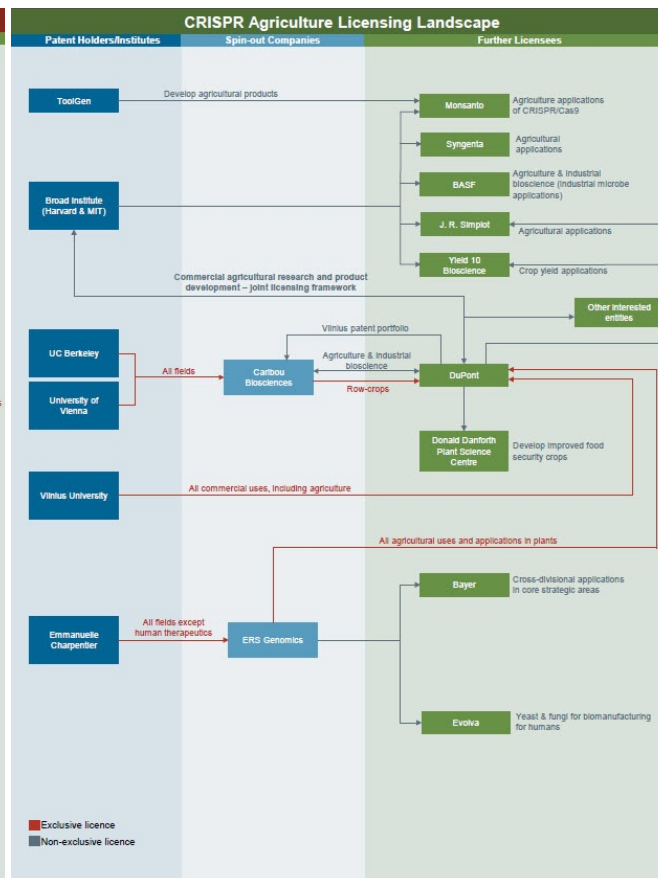
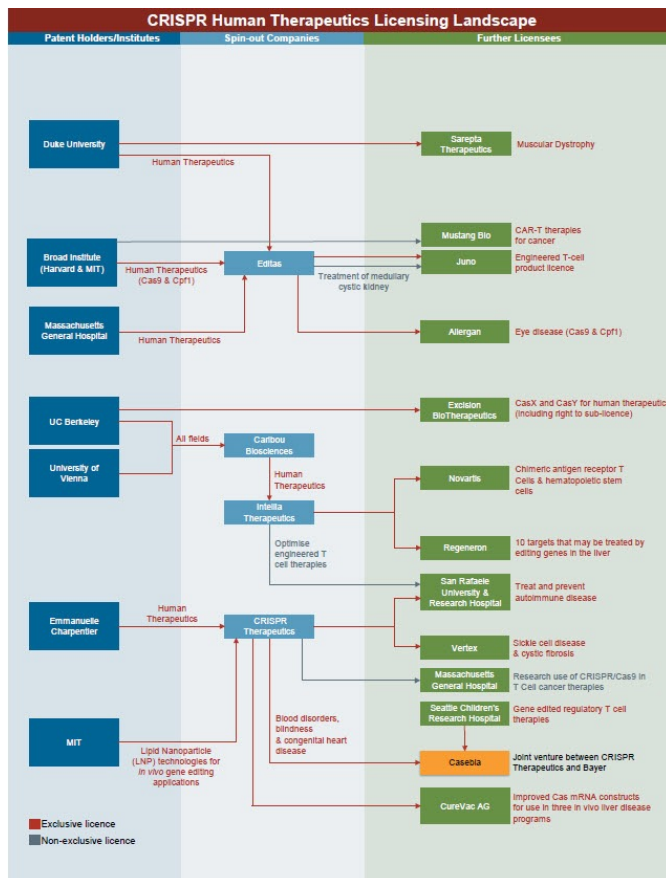
## CRISPR Commercialisation

Companies in 2021 Founded on CRISPR-Cas9 Patents From the Original IP Dispute		
<b>Jennifer Doudna</b> University of California, Berkeley	<b>Feng Zhang</b> MIT-Harvard Broad Institute	<b>Emmanuelle Charpentier</b>
Caribou Biosciences	Sherlock Biosciences	CRISPR Therapeutics
Mammoth Biosciences	Arbor Biotechnologies	ERS Genomics
Intellia Therapeutics	Editas Medicine*	
Scribe Therapeutics	Beam Therapeutics	

\* Jennifer Doudna was an original co-founder of Editas but is no longer involved after a reported falling out with Zhang.

<https://www.synbiobeta.com/>

# CRISPR Commercial Application



<http://www.allenoverly.com/publications/en-gb/CRISPRsite/Pages/default.aspx>

# Artificial Intelligence (AI) Inventing

**Definition:**

AI relies on performing mathematical methods or algorithms by way of a computer implementation. These methods or algorithms are typically capable of learning from data and process data in a manner that demonstrates „intelligence“.

**Question:**

**Can AI be an inventor?**



# Artificial Intelligence (AI) Patenting

**At present, the answer is NO.**

**An Inventor must be a human being.**



<https://new.epo.org/en/boards-of-appeal/decisions/j200008eu1.html>

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## Summary

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- Inventorship and patent ownership are incentives to drive innovation
- A patent protects an invention, not a discovery
- An inventor is a natural person
- Make sure that all rights are collected

Thank you.

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