ERS Genomics

Is the global **CRISPR/Cas9** licensing leader

Grants **worldwide access** to the essential CRISPR/Cas9 patent portfolio

Offer **non-exclusive licenses** across life science sectors

It was clear the **scientific community** was waiting for… a tool that will simplify the **genetics of their organisms of choice**…the spectrum of applications, is quite incredible

Emmanuelle Charpentier
Founder: ERS Genomics
Winner: Nobel Prize

CRISPR advantages:

Why choose CRISPR?

CRISPR gene editing efficiency is higher than ZFNs or TALENs

Less screening to identify desired mutations.
Faster generation of cell & animal models.

CRISPR design is simple & quick

ZFNs & TALENS take weeks to design, assemble & test. CRISPR is faster and more affordable.

CRISPR can be multiplexed/retargeted by simply using different guide RNAs

ZFNs & TALENs require new designs and constructs for retargeting. CRISPR offers a greater range of multiplex possibilities.

CRISPR is the only platform that offers library-based, high through-put screening approaches

CRISPR-KO (knockouts)
CRISPR-i (down regulation)
CRISPR-a (up regulation)

CRISPR is the **most studied gene editing technology** in the world.
Expect continued improvement and **discovery of new uses.**

ERS Genomics, our story…

2012
CRISPR/Cas9 gene editing technique patented by Emmanuelle Charpentier & Jennifer Doudna.

2014
ERS Genomics founded by Emmanuelle Charpentier, Rodger Novak & Shaun Foy to grant licenses to revolutionary gene-editing technology.

ERS begins to establish license agreements globally with companies who would benefit from the ‘genetic scissors’.

2016
First European patents granted

2018
US patent office grants ERS its first US patent for CRISPR/Cas9 gene editing

2020
Emmanuelle jointly awarded the Nobel Prize for ‘rewriting the code of life’.

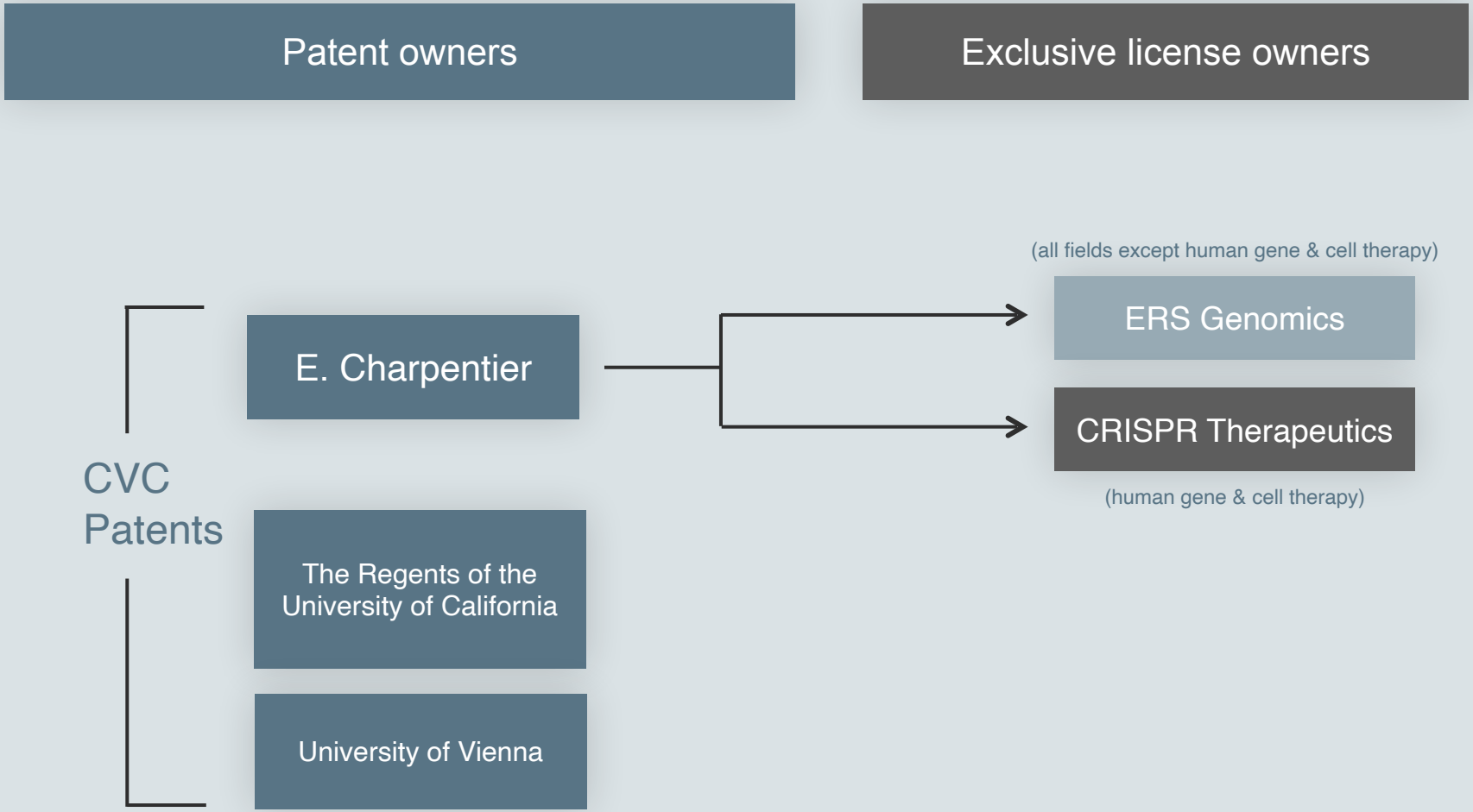
European Opposition Division affirm key CVC patent over Opposition.

Today, we provide licenses to the CRISPR/Cas9 patent portfolios held by Emmanuelle Charpentier, The Regents of the University of California, and University of Vienna (the CVC Group).

80+
Granted patents

80+
countries

The patents are jointly owned

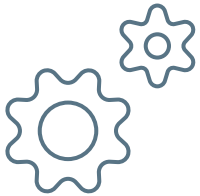


The Patent owners are referred to as **“CVC”**

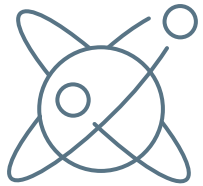
While the patents are jointly owned, ERS operates **independently** and provides **legal access** to the CVC portfolio.

Our patent estate:

Our **CRISPR** patent portfolios cover:



Compositions & methods of using Cas9 with dual or single guide RNA and delivery formats of these compositions in a cell



Use of **CRISPR/ Cas9** complex to cleave **DNA**

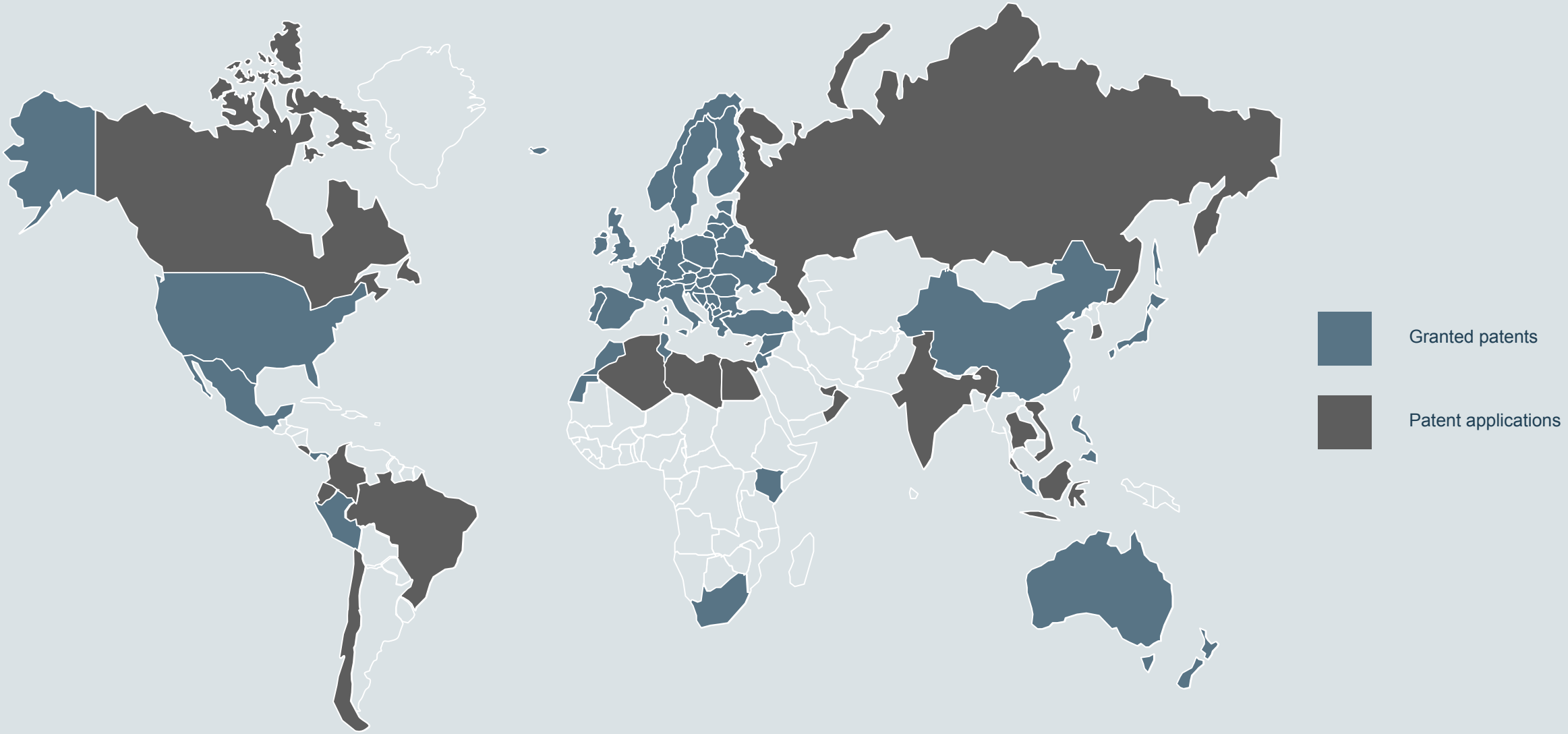
Using mutated Cas9, such as dCas9 or nCas9, to:

bring an effector domain to a specified DNA sequence, such as for CRISPRi and CRISPRa

Base editing

Nicking DNA

World patent status



CRISPR/Cas9

If you are using, or plan to use, CRISPR/Cas9 gene editing technology, then you need a license to the CVC portfolio.

This is a straightforward process that our experienced and helpful team will complete with you.

Securing your **license** means:

- Safeguarding your work
- Ensuring the legitimacy of your project
- Avoiding reputational implications
- Maintaining ‘speed to market’ unchallenged
- You are officially recognized as an ERS licensee

ERS grants licenses in following fields:

Internal R&D

Discovery, validation, & screening of novel drugs and drug targets. Cell line & animal model generation including iPSC & stem cells.

Commercialization

Selling research tools, kits, reagents, cell lines & animal models for laboratory research

CRO, CMO & CDMO

Services including GMP production of healthcare products

Bioproduction

Manufacturing of therapeutics such as monoclonal antibodies & proteins

Clinical diagnostics

Personalized medicine products and companion diagnostics

Companion animals & livestock

Disease treatment & prevention

Industrial production

Synthetic biology and materials - enzymes, biofuels, chemicals

Some of our licensees

ers GENOMICS

Internal Research

- GlaxoSmithKline
- MERCK INVENTING FOR LIFE
- BAYER
- REGENERON
- Daiichi-Sankyo

CRO's/CMOs

- evotec
- charles river
- TACONIC
- Lonza
- gen 0 way

Tools/Reagents

- ThermoFisher SCIENTIFIC
- ATCC
- GenScript Make Research Easy
- SYNTHEGO
- NEW ENGLAND BioLabs

Industrial Bio.

- DUPONT
- evolva
- novozymes
- Firmenich for good, naturally
- Cargill

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License Structures

Financial terms depend on **several factors:**

Field			
Internal R&D	Commercial applications	Bioproduction	Animals

Territory			
Worldwide	Europe	North America	Asia/Pacific

Company Size (FTEs)			
1 - 49	50 - 499	500 - 4999	5000 and over

Internal R&D use only:

Upfront Fee	Annual Maintenance Fee (No reach through to Tx products)

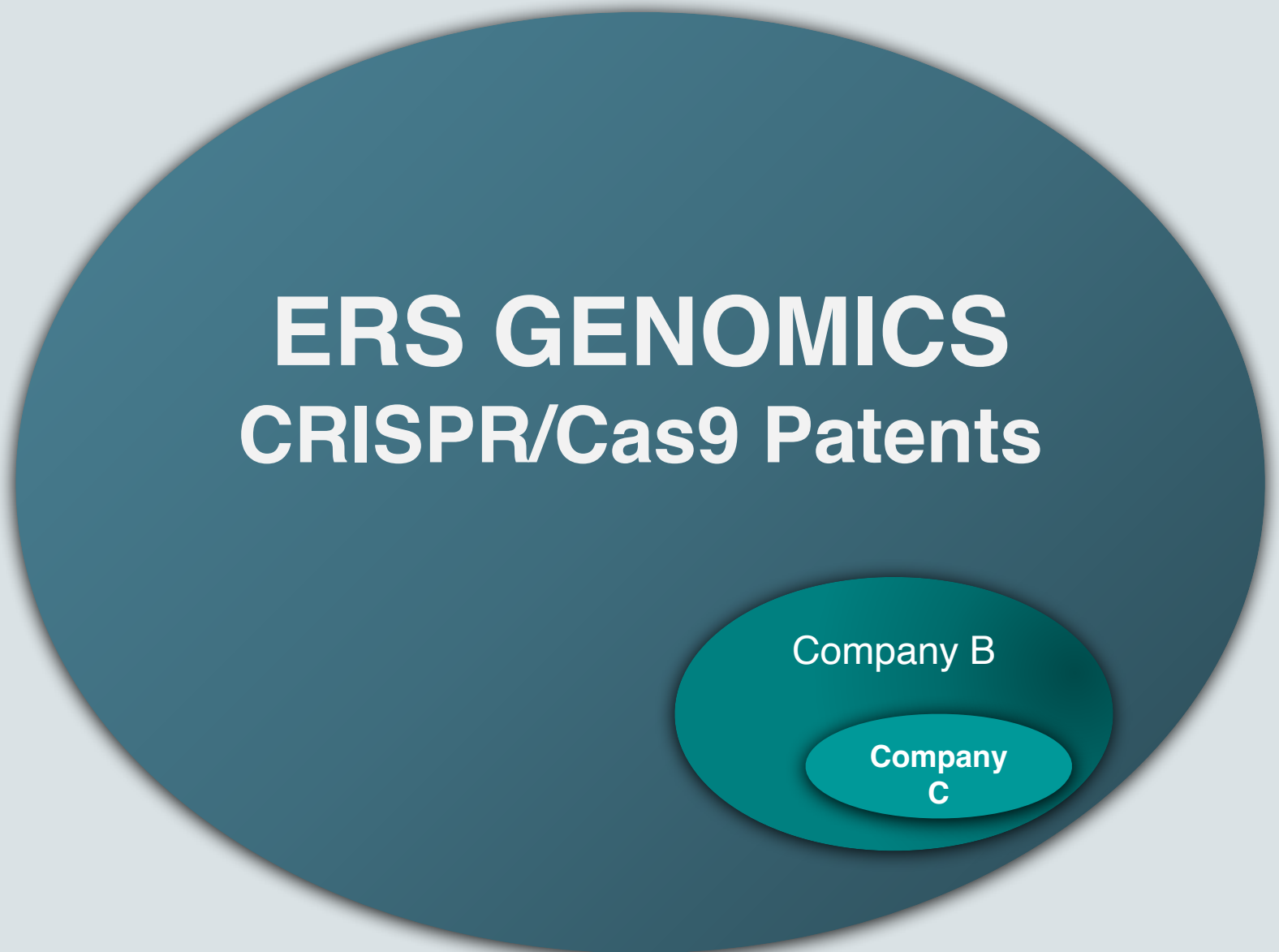
Commercial Applications (also includes internal R&D use):

Upfront Fee	Annual Minimum Royalty	Royalty on Net Sales of CRISPR related products/services

Bioproduction (add on)

Increased Upfront Fee	Annual per product manufacturing fee	No reach through to Tx products

CRISPR/Cas9 access begins with ERS…



ERS

If you want to use CRISPR/Cas9 you start with a foundational license from ERS Genomics.

B

Depending on your application of CRISPR you may need an additional licence from company B (i.e. The Broad).

C

Depending further on your specific application you may need other licences (Company C for example.)

When we say foundational…

The CVC portfolio patents claim:

- Compositions and methods of using Cas9 with a guide RNA to form a CRISPR/Cas9 complex that binds a specified DNA sequence
- Various formats for delivering these complexes in cells of all types
- Use of the CRISPR/Cas9 complex to cleave DNA (resulting in knock-outs, insertions or mutations)
- Use of mutated Cas9 to ‘nick’ DNA (in place of cleavage) or to bring an effector domain to a specified DNA sequence to regulate gene expression in a cell
- Compositions of guide RNAs in a variety of formats including various lengths, chemical modifications, and base compositions

While some other IP portfolios may contain numerous and varied vector-specific patents, a CVC foundational patent license will always be necessary.

Europe: EPO upholds CVC's 3rd CRISPR patent over opposition

Last week (March 25) EPO announced the maintenance of CVC's third European patent (including "eukaryotic methods") over all opposition, further strengthening CVC's fundamental coverage in Europe.

ERS & CVC remain the key source for access to foundational CRISPR/Cas9 technology in Europe and worldwide.

February 28th US interference ruling

The ruling: The US patent trial and appeal board ("PTAB") ruled that the Broad Institute and Harvard will be allowed to retain its intellectual property over the use of CRISPR-Cas9 gene editing in eukaryotes. The PTAB confirmed that its decision regarding priority of invention was focused on single-guide CRISPR/Cas9 systems in eukaryotic cells and has no impact on any of CVC's 46 already granted US foundational patents. CVC retains its patent rights in the issued US patents that were never involved in this interference. These patents cover a variety of compositions and methods for CRISPR/Cas9 gene editing, including dual-guide and single-guide formats and uses 'in a cell' (any cell, including eukaryotes).

The meaning: This ruling **does not affect** any of CVC's granted US foundational patents that cover compositions and uses of CRISPR/Cas9 in all settings, including eukaryotic cells. Use in eukaryotic cells in the US still requires licensing from both CVC and the Broad.

The CVC portfolio of patents covering CRISPR/Cas9 gene editing remains the essential global intellectual property for the practice of this technology.

What's next: An appeal is pending