

**LES FRANCE
2017 Licensing Conference**



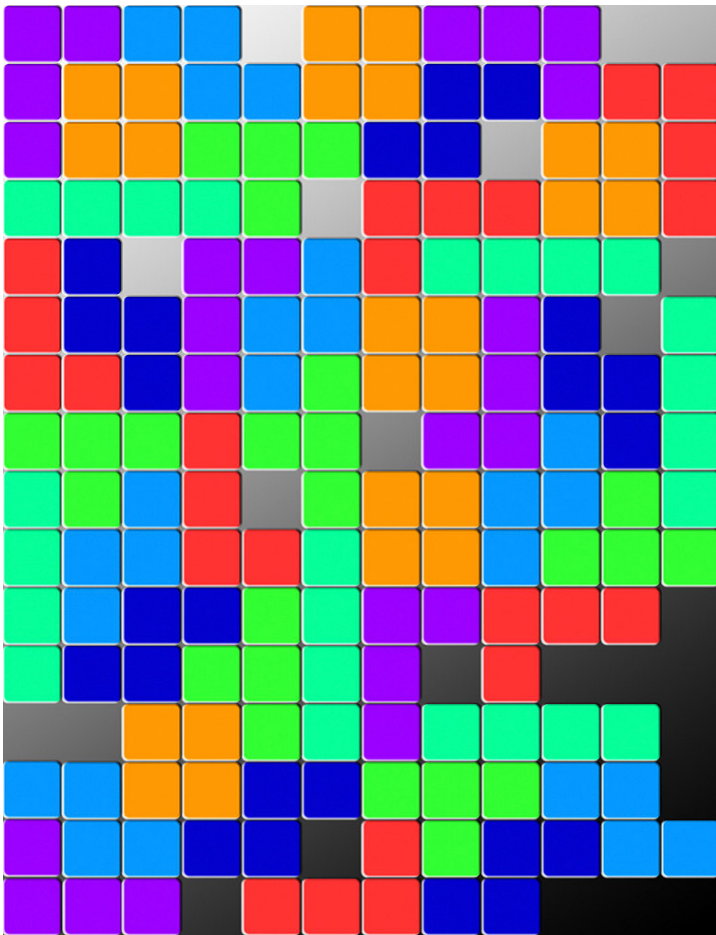
What Can a Patent Pool Do For the Promise of CRISPR?

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Biotechnology Licensing
MPEG LA, LLC**

Discussion Outline

- **The Foundation of Commercial Development**
- **MPEG LA Licensing Model**
- **CRISPR-Cas9 DNA Editing System**
- **CRISPR Markets and Patents**
- **CRISPR Patent Pool – why and how**

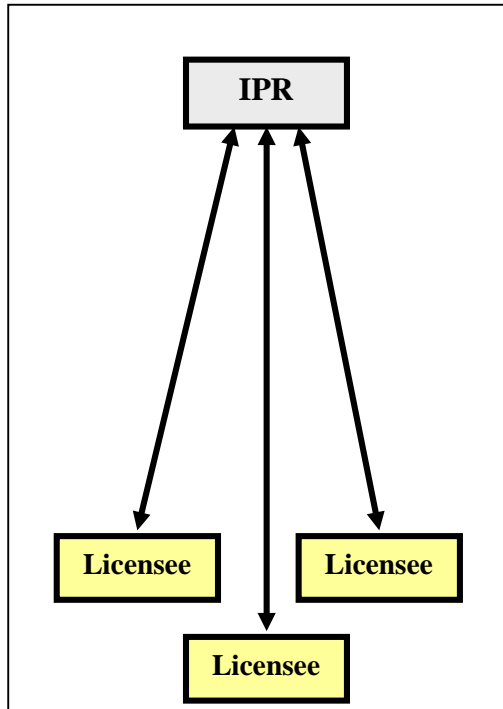
Commercial Development in Life Sciences Relies on Patent Protection and Licensing Efficiency



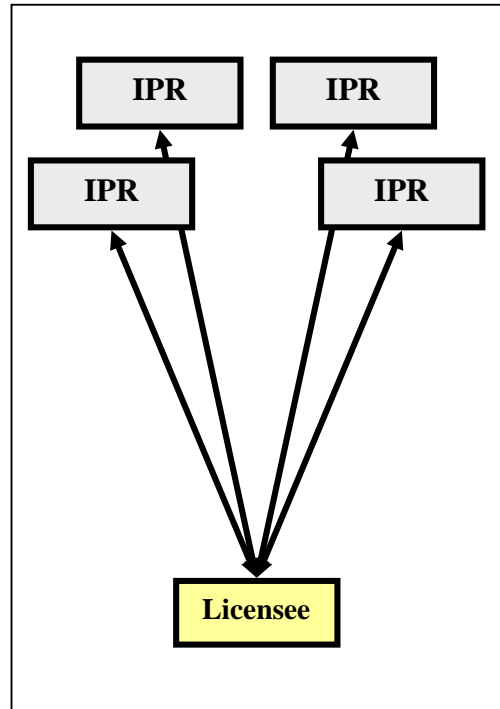
- Patents provide incentive for commercial development of basic scientific discoveries
- Typically there are foundational patents followed by patents on improvements, specific applications, and related technologies
- Oftentimes *complementary patents* are held by multiple, different entities
- Can there be licensing efficiency in a crowded, uncertain and confusing space?

MPEG LA[®] Licensing Model

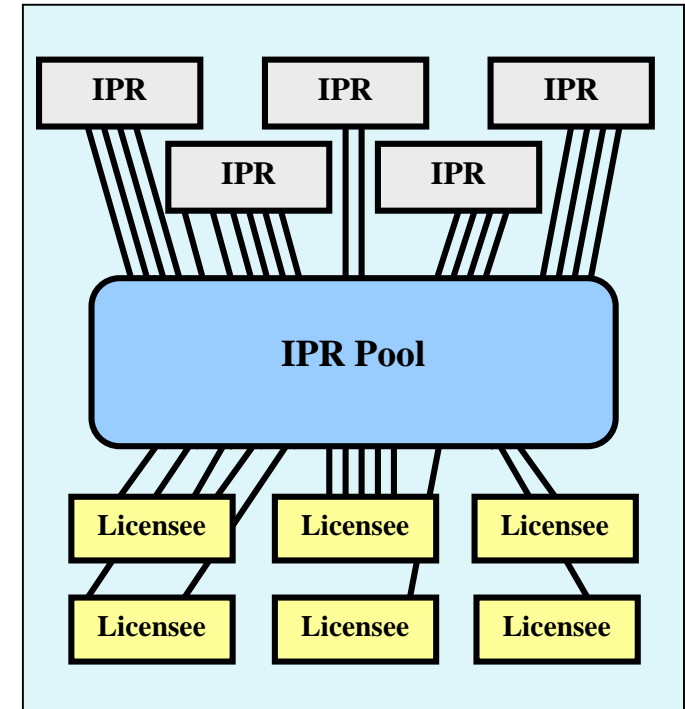
“One-to-Many”



“Many-to-One”



MPEG LA[®]
“Many-to-Many”



MPEG LA pioneered the modern-day patent pool

MPEG-2 Patent Pool

- More than 20 years ago, the MPEG-2 digital video standard faced uncertainty around patent licensing
- The access and transactional efficiency afforded by the MPEG-2 patent pool helped to develop a commercial ecosystem that made MPEG-2 the most successful standard in consumer electronics history
 - ~ 10 billion devices
 - ~ 65 billion video discs
 - ~ \$5 trillion in product sales

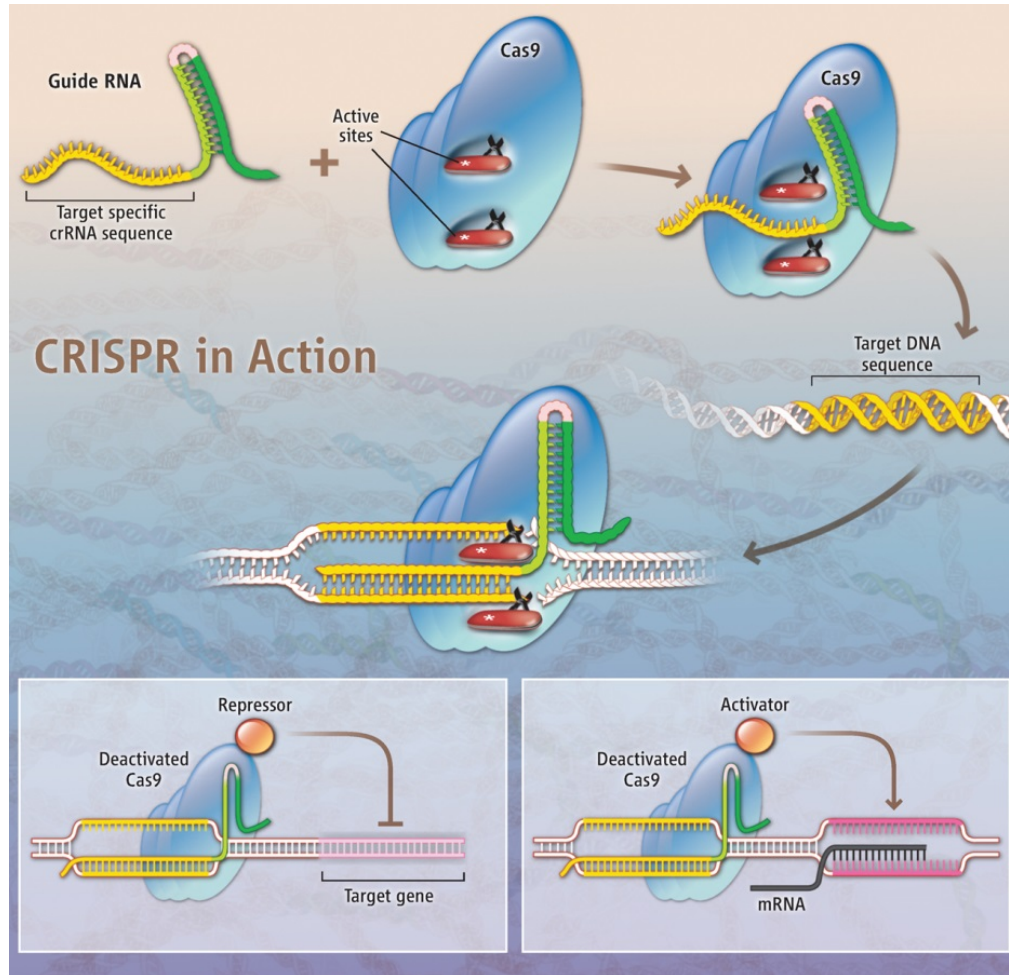
MPEG LA Today

- The solution has become the template
- MPEG LA patent pool licenses consisting of some 15,000 patents in 85 countries with some 245 patent holders and more than 6,000 licensees have helped produce the most widely used standards in consumer electronics history

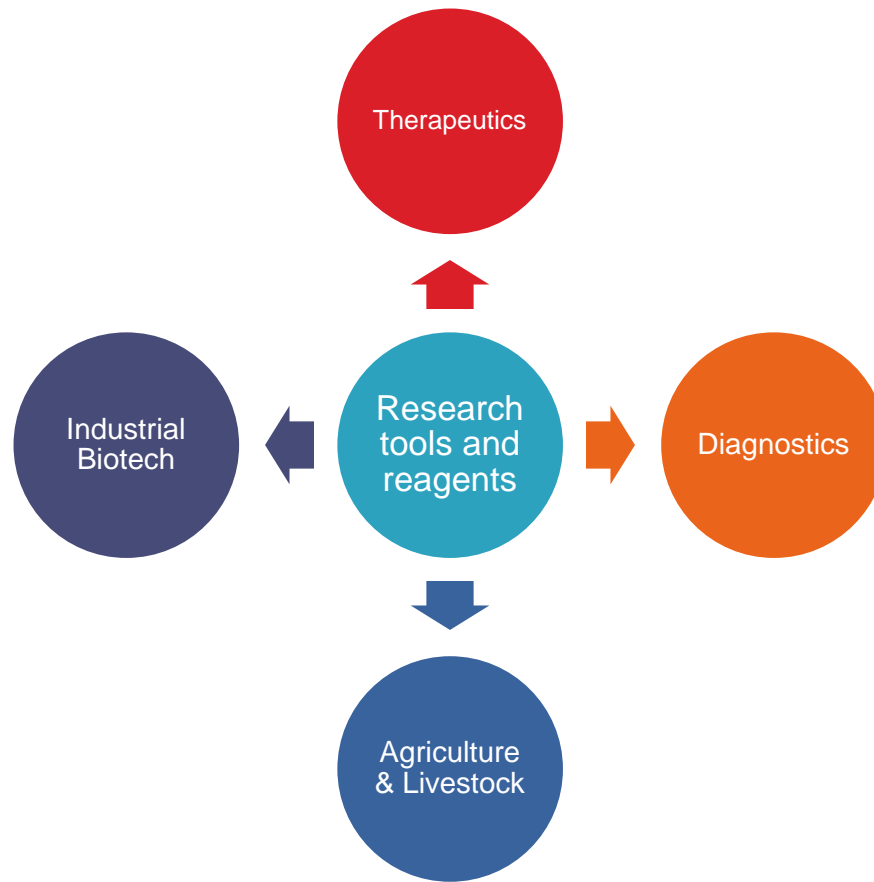
CRISPR: Editing the Code of Life



CRISPR-Cas9 DNA EDITING SYSTEM



CRISPR Markets

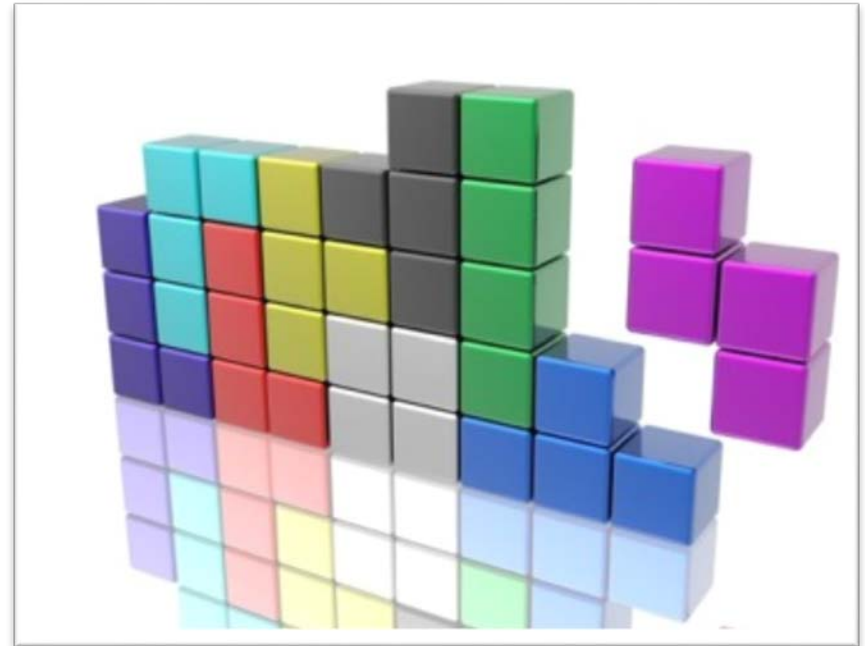


CRISPR Patent Landscape

Large and Growing

IPStudies of Switzerland has classified hundreds of patent families directed to CRISPR-Cas (mainly Cas9)

- Systems
- Components
- Modified cells/organisms
- Methods
- Applications



CRISPR Patent Snapshot

University of California/Charpentier

CRISPR-Cas9 systems featuring single guide RNA for use in any environment

The Broad Institute of MIT and Harvard

CRISPR-Cas9 systems for use in eukaryotes

Vilnius University

CRISPR-Cas9 systems featuring recombinant Cas9-guide RNA complex (“RNP complex”)

ToolGen Inc.

CRISPR-Cas9 systems for use in eukaryotic and mammalian cells

MilliporeSigma

Methods for integrating a donor sequence in a eukaryotic chromosome using CRISPR-Cas9

Collectis

Method of preparing genetically modified T cells for immunotherapy using an RNA-guided endonuclease (expressed from transfected mRNA) and a specific guide RNA (expressed as a transcript from a DNA vector)

CRISPR Patent Pool

A Solution Whose Time Has Come

- Vast potential to improve quality of life
- Worldwide mass market
- Increasing volume of patents held by multiple entities covering complementary subject matter
- Business risks and licensing constraints/uncertainty threaten rise of a sufficient ecosystem for robust commercial development
 - Interferences, oppositions, litigations
 - Freedom to operate will not be possible without multiple licenses
 - Even if multiple licenses were possible, stacking royalties, multiple reporting and diligence obligations will be burdensome

CRISPR Patent Pool

A Solution Whose Time Has Come

- Voluntary pool in which stakeholders decide CRISPR's destiny in concert with the market is preferable to solutions imposed from on-high (e.g., compulsory licensing, march-in, regulation)
- Pool balances access by many users with return on investment for innovators – while speeding market development
- When more developers have CRISPR licenses, there will be more opportunities for investment, leading to the rise of a robust commercial ecosystem to drive CRISPR to its full potential
- Provisions can be made for
 - Royalty-free use for academic research consistent with current licensing practices in the field of life science
 - Ethical and social concerns regarding potential applications of the licensed patents



CRISPR-Cas9 Joint Licensing Platform

Announced 6 December 2016

**MPEG LA to Help Solve the CRISPR Puzzle
by Making the Pieces Easily Accessible to a
Multi-User Market**



Call for Patents

Announced 25 April 2017

Patent holders invited to participate in creating
the CRISPR-Cas9 Joint Licensing Platform

Many have answered the call



First Facilitation Meeting

Scheduled for February 2018

Stay tuned!