Epigeneron’s key technologies for drug discovery research

Epigeneron, Inc.

October 3, 2019

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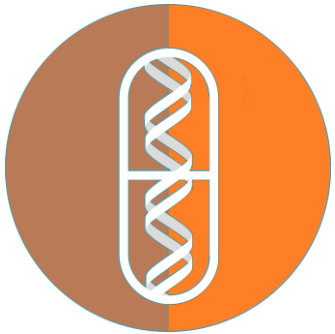


First-in-class drug target identification

by locus-specific ChIP technology to identify novel drug targets which modulate gene expression

Global market and challenges for major infectious diseases

	Prevalent cases	Revenue of drugs	Challenges
HBV	**294.5 Mil**	**$2.3 Bil**	Limited efficacy and limited accessible drugs
HIV	**36.7 Mil**	**$22.0 Bil**	No drug to remove or inactivate provirus (Limited efficacy)
Pathogenic bacteria	**> 300 Mil**	**$38.3 bil**	Outbreaks of drug-resistant bacteria

Source: WHO, BCC publishing, CDC, Heptitis B foundation, World bank, etc

Challenges to the conventional approaches

Limited efficacy

Resistant to existing antibiotics

Our solutions

Viruses

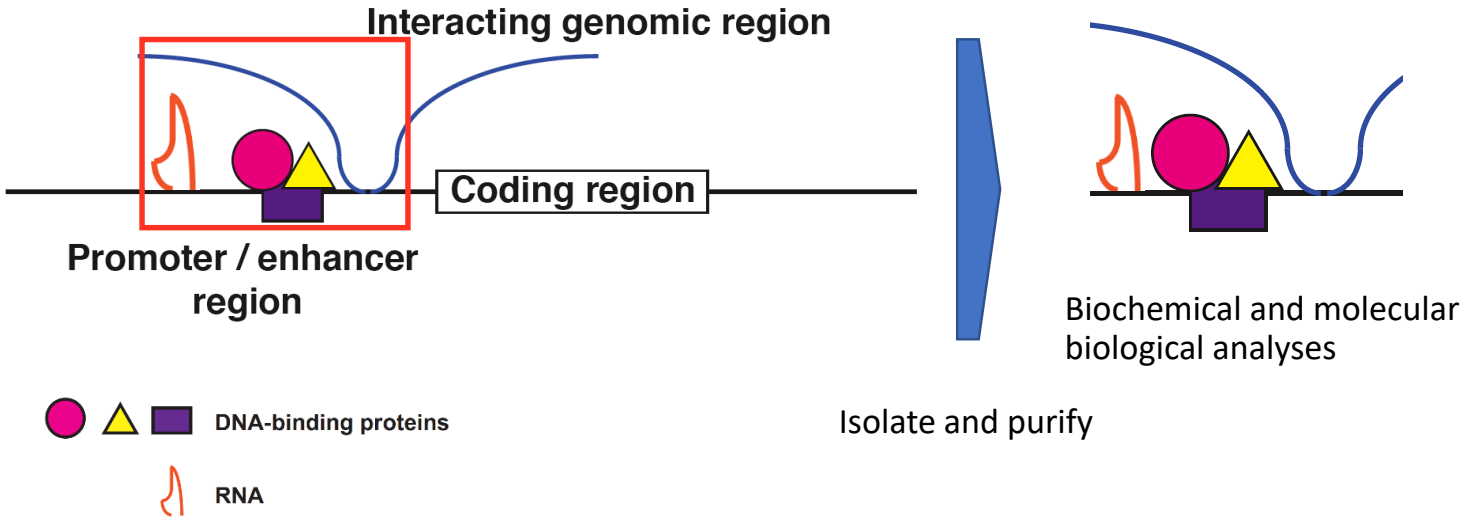
- ✓ Targeting virus genome themselves.

Bacteria

- ✓ Not to kill the pathogens but to remove pathogenicity
- ✓ Targeting effector genes that give pathogenicity to pathogens

Biochemical purification of the locus responsible for pathogenesis is a direct approach to identify regulators of expression of the disease-causative genes

- Locus-specific ChIP is to isolate specific genomic regions while retaining molecular interactions to identify molecules (proteins, RNAs, and other genomic regions) associated with the target genomic regions.
- The locus-tagging can be achieved by (1) insertion of the recognition sequences of an exogenous DNA-binding molecule or (2) engineered DNA-binding molecules such as the CRISPR system.



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Transcription factors

Enzymes modifying histones and other proteins / RNAs*

DNA modifying enzymes*

Chromatin remodelers

DNA-binding proteins

DNA-binding RNA

Genomic regions regulating gene expression such as enhancers and silencers

***: Potentially appropriate drug targets of drug discovery research**

Hepatitis B virus (HBV)

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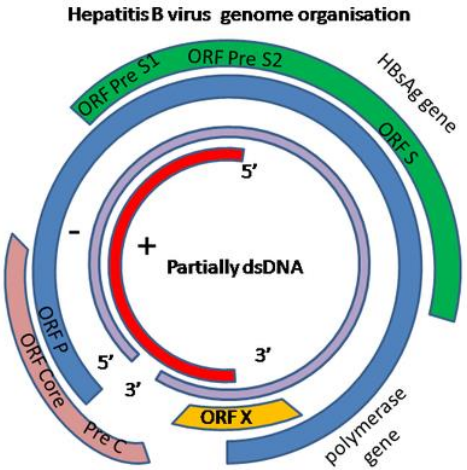
Strategy	• Suppress viral transcription and replication.
Approach	• Target the HBV genome in the host hepatocytes. • Identify molecules associated with the HBV genome that function in transcription and replication of the viral genome. • Develop inhibitors of the identified drug targets.



Human immunodeficiency virus (HIV)

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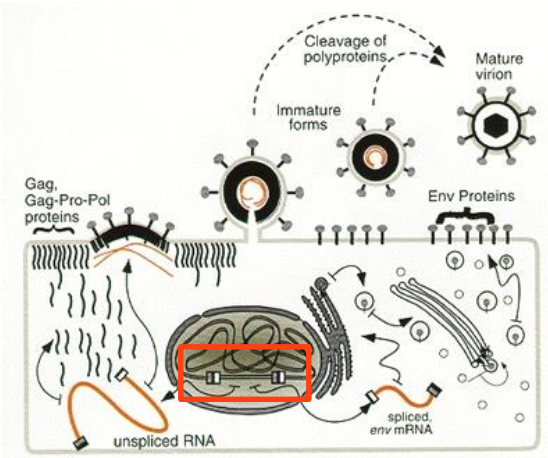
Strategy	• **Suppress activation of pro-virus.**
Approach	• **Target the HIV pro-virus integrated in the host genome.** • **Identify molecules associated with the HIV pro-virus that function in activation of the pro-virus.** • **Develop inhibitors of the identified drug targets.**



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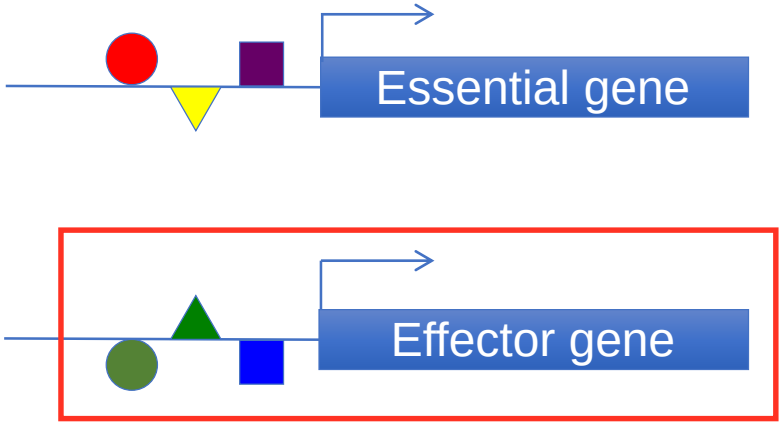
Strategy

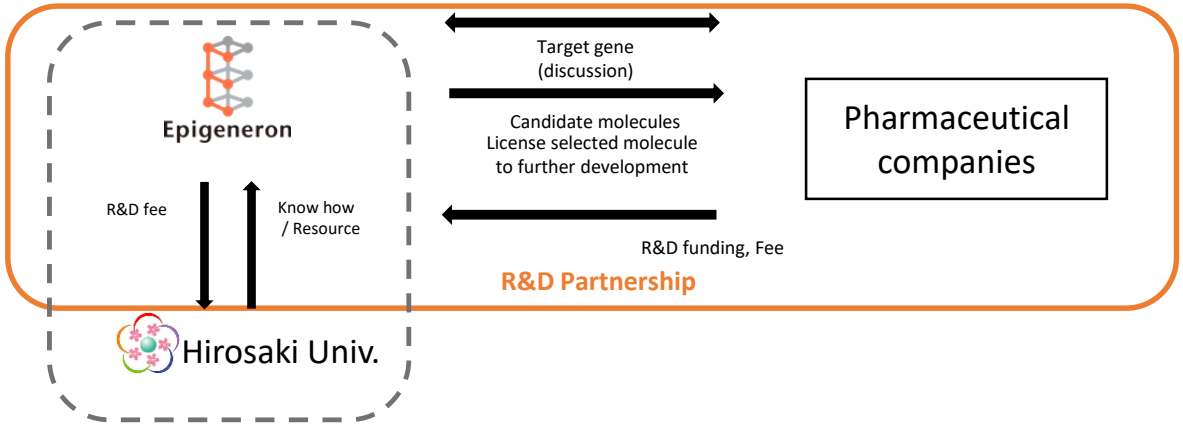
- Do not induce emergence of drug-resistant pathogens.
- Not to kill the pathogens but to remove pathogenicity.

Approach

- Target the bacterial genome regulating:
  - ✓ Genes essential for survival of the pathogen.
  - ✓ Effector genes involved in pathogenesis.



Our business model and research collaboration with pharmaceutical companies



Strength of Epigeneron:

- **Proven track record for iChIP/enChIP technology.**
- **Identify potential drug targets within 6-12 months.**
- **Research collaboration in translational research with Hirosaki University School of Medicine.**

Locus-specific ChIP:

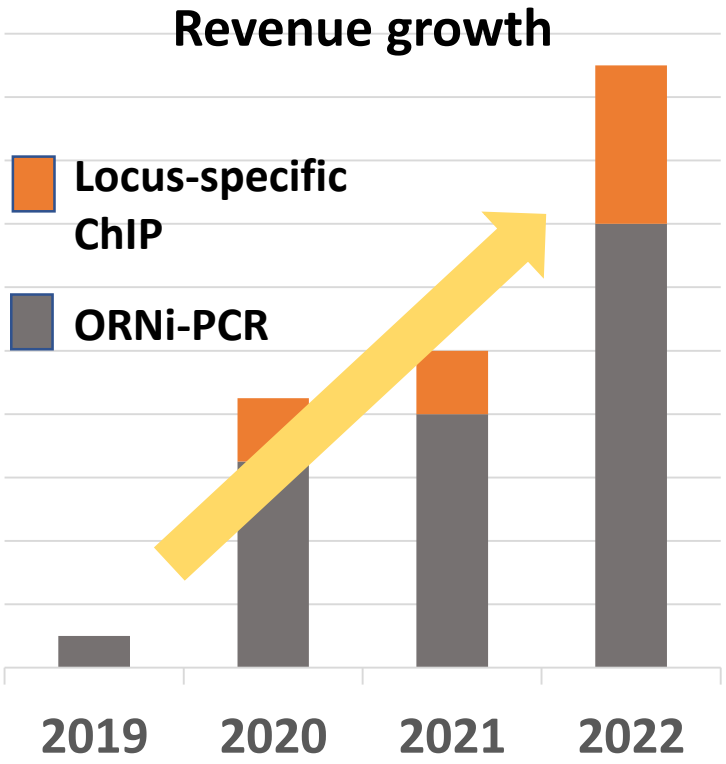
- Research collaboration with RaQualia for idiopathic pediatric nephrotic syndrome
- Progress of in-house projects:
  - ✓ Oncology: p16 and tumor-specific PD-L1
  - ✓ Neurology: APP

ORNi-PCR (other platform technology) :

- Commercialization for detection of genome-edited cells
- License to diagnostics, medical device and CDMO companies

Financing:

- Series B



History

Epigeneron

April 16, 2015:	**Founded as LLC**
Dec, 2017:	**Incorporated**
Feb, 2018:	**Seed round [15 M JPY (ca. $14k)] from University of Tokyo Edge Capital (UTEC)**
May, 2018:	**Opened research Facility in Bayer CoLaborator in Kobe**
Sep, 2018:	**Series A [200 M JPY (ca. $1.9M)] from UTEC**

Team

Epigeneron

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Auditor

Kazumasa Maruoka
Administrative Manager

Ko Ishihara, Ph.D.
Senior Researcher

Miyuki Yuno
Researcher

Thank you!