

TECH SCAN

CRISPER- Powered Gene Innovation



CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) is a programmable gene-editing technology that uses a guide RNA to direct a Cas nuclease (commonly Cas9) to precise DNA sequences, enabling accurate insertion, deletion, or correction of genetic material across diverse cells and organisms. Acting like molecular scissors, CRISPR-Cas9 introduces targeted DNA cuts that cells repair, while advanced modalities like base and prime editing allow single-letter changes without double-strand breaks, improving precision and expanding therapeutic potential. The platform has progressed rapidly from research to the clinic, with landmark approvals of CRISPR-based therapies signaling broader adoption in medicine, agriculture, and biotechnology.

This technology should be patented to secure exclusive rights over novel CRISPR constructs, delivery systems, target applications, and workflows attracting investment, enabling licensing, and protecting competitive advantage for commercialization at scale. Strong IP positions help translate advances such as guide design methods, editor variants, and therapeutic protocols into protected products and partnerships across global markets.



INNOVATION TIMELINE

1987

First CRISPR-like DNA repeats reported in *E. coli*, marking the earliest observation of the locus in bacteria.

2005

Spacers matched phage/plasmid sequences, linking CRISPR to antiviral defense in microbes.

2012

Programmable CRISPR-Cas9 demonstrated for targeted DNA cleavage, launching modern gene editing.

2015

CRISPR named Breakthrough of the Year by Science, reflecting rapid impact in biology.

2019

Prime editing unveiled for versatile "search-and-replace" DNA edits without double-strand breaks.

2023

First regulatory approvals anticipated for a CRISPR-based therapy (exa-cel) for SCD/TDT, marking a clinical milestone.

2024

First FDA-cleared clinical trial for an in-human prime editing therapy initiated, expanding next-gen editors to the clinic.

2002

"CRISPR" term coined and associated Cas genes identified, suggesting an adaptive immune role in prokaryotes.

2007

Experimental proof that CRISPR provides adaptive immunity against bacteriophages in bacteria.

2013

First CRISPR-Cas9 genome editing in mammalian cells broadly adopted across research labs.

2016

Base editing introduced to enable single-nucleotide changes without double-strand breaks.

2020

Nobel Prize in Chemistry awarded to Doudna and Charpentier for CRISPR-Cas9 gene editing.

Dec 2023-Jan 2024

Exa-cel (CASGEVY) approved for sickle cell disease and subsequently for beta thalassemia, the first CRISPR therapy authorizations.

2025 & Beyond

Rapid maturation of base and prime editing applications, delivery advances, and diversified clinical programs across genetic diseases.

PATENTABLE ASPECTS

Engineered Cas
Nuclease Variants

Optimized Guide
RNA Scaffolds

Base and Prime
Editors

Epigenome and
Transcription Modulators

AAV and LNP Delivery

RNP and Plasmid
Formats

PAM Expansion
Strategies

Off-target
risk reduction

Multiplex edit
Architectures

Tissue-specific
Expression Cassettes

HDR Donor Templates

Indications-specific
Protocols

Inducible Safety
Switches

Standardized Edit
Assays

Split-intein Cas
Systems



PATENT STATISTICS

115

SUMITOMO CHEMICAL

24

NOVARTIS

24

TCR2 THERAPEUTICS

23

DSM IP ASSETS

15

SANA BIOTECHNOLOGY

14

INSTITUTE OF CROP SCIENCES
CHINESE ACADEMY OF
AGRICULTURAL SCIENCES

12

CHINA AGRICULTURAL
UNIVERSITY

10

JIANGNAN UNIVERSITY

10

BOARD OF TRUSTEES OF
LELAND STANFORD JUNIOR
UNIVERSITY

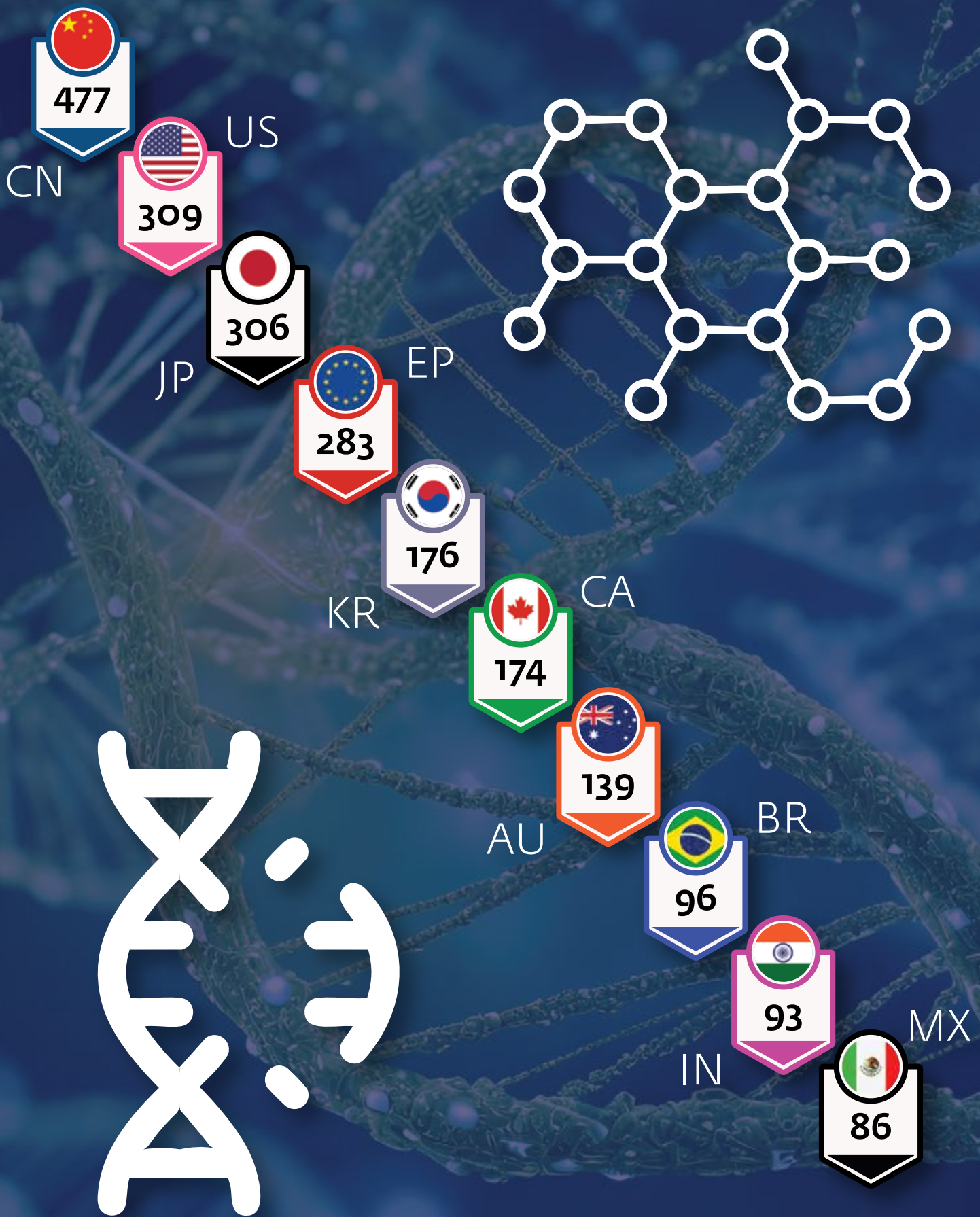
8

GARUDA THERAPEUTICS

Database: Questel Orbit

Data Range: 01/01/2020 - 31/10/2025

PATENT LANDSCAPE



Database: Questel Orbit
Data Range: 01/01/2020 - 31/10/2025

YEAR WISE PATENT FILING TREND

2025

61

134

2024

152

2023

175

2022

158

2021

2020

193



NOTABLE INNOVATIONS

Patent Application	Priority date	Title	Assignee
CN120350058	2025-03-24	Application of Blue Light Receptor Gene ZmZTLb in Regulation and Control of Flowering Time of Corn	Sichuan Agricultural University
CN117568387	2023-11-21	Method For Improving Peanut Anthocyanin Content By Utilizing Gene Editing	Shandong Academy of Agricultural Sciences
CN115679452	2022-11-03	T cell CRISPER Library Screening Method	Fudan University Shanghai Cancer Center
CN115725483	2022-08-04	Gene Editing Engineering Strain for Producing Levodopa and Application	Xuzhou Hegu Life Technology
US20240209354	2022-04-28	Multiplex CRISPR/Cas9-Mediated Target Gene Activation System	Salk Institute For Biological Studies
CN114908124	2022-04-24	Application of Zinc-Combined Alcohol Dehydrogenase Gene In Regulation And Control of Insect Mating Behavior	Zhejiang University
US20220127602	2020-10-22	Grna Targeting MIR-29b, AAV8-Crisper/Cas9 System and Use Thereof	Shanghai University
CN111534514	2020-03-09	Novel Coronavirus Detection Kit Based on Crisper	Suqian First Hospital

WHITESPACES

Engineer
PAM-lite, compact
Cas nucleases.

Raise prime
editing efficiency
in HSCs.

Standardize
off-target SV
detection assays.

Develop long-term
safety and durability
registries.

Create re-dosable,
extrahepatic LNP
platforms.

Improve endosomal
escape chemistries
for RNPs.

Define comparabil-
ity frameworks for
editor upgrades.

Optimize pegRNA/RTT
design with validated AI.

Integrate multi-modal
edits (CRISPR +
base/prime) playbooks.

Industrialize release
potency assays for
prime editing.

Enable in vivo
prime editing
for airway/liver.

Expand tissue
tropism beyond
liver with LNP
reformulation.

Build GMP-ready,
closed-system
editing workflows.

Create immune-
evading Cas/editor
variants for redosing.

Develop CNS and
muscle-targeted
nanoparticles.

Validate clinically
relevant on-/off-
target panels.

Database: Questel Orbit

If you would like to learn more about any of these areas or have specific questions, we're here to provide further information and insights. Our team is dedicated to driving progress and staying at the forefront of CRISPER- Powered Gene Innovation.

About IP Bazaar

IP Bazaar is an initiative towards successful commercialization of Intellectual Property Rights. IP Bazaar is a private limited company, acts for both innovators/creators and investors; and manages the commercialisation of Intellectual Property. It operates through a wide network of association with companies, industries, industry-associations, entrepreneurs, government organization, NGOs, Universities, Venture Capitalists, overseas law firms, overseas technology transfer companies and through Patentwire.

Disclaimer

IP Bazaar has used reasonable endeavours to ensure that contents of this report were correct at the time the relevant pages were created, modified and published. IP Bazaar does not make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the firms. The views and opinions of authors expressed herein do not necessarily state or reflect those of the firm.



Where Mind Meets Market

© IP Bazaar 2025. All Rights Reserved.

This report is for informational purposes and is not intended to constitute legal advice.

Contact us:



Lalit Ambastha

Co-Founder, IP Bazaar

Mob: +91-9811367838

E-mail: lalit@ipbazaar.com



Medha Kaushik

Director | Special Projects & Tech Transfer

Mob: +91-6359777555

E-mail: medha@ipbazaar.com

© IP Bazaar 2025. All Rights Reserved.



IP BAZZAAR TECHNOLOGY CONSULTANTS PVT. LTD.

716, Seventh Floor, DLF Prime Towers,
Okhla Phase I, New Delhi-110020, India

www.ipbazaar.com