

AI-DRIVEN DRUG DISCOVERY

Patent Landscape Report

This report provides a patent landscape of the advances in Using Artificial Intelligence in Drug Design. It includes the analysis of 1087 patents of various companies from 2002 to 2024.

- **STIMAnalytics** is an AI-powered platform for enterprises, technology-based firms, R&D departments, marketing and new product development departments, professional experts and academic researchers to conduct advanced analytics on patents, articles and market data with ease.
- With 10+ years of experience, we offer Science, Technology, Innovation, and Market Analytics reports and services for innovative, applicable and integrated results.
- Stimanalytics.ir

- Founded in 2015
- Active in national and international IP, including Patent, Trademark, and industrial design registration.
- Specialized in Patent drafting, patent prosecution, and Patent Analysis."
- <https://ikafnet.com/>



Leyla Zarei

- Over 15 years in the IP field, specializing in patents.
- IKAF founder,
- MSc in Environmental Technology, Wageningen University – Nuffic scholarship
- LLM in Intellectual property, Turin University (WIPO scholarship)



Mohammad Naghizadeh

- 18 years experience in Technology and Innovation Management
- STIMAnalytics Co-founder
- Ph.D in Technology Management
- Associate Professor, Allameh Tabataba'i University
- Director of ATU Incubator

Contents

Why AI-Driven Drug Discovery

Landscape Overview & Top Players

Technology Analysis

What is the main Tech Focus?

Market and Competitor Analysis

Top Player's Tech Profile

Q&A

- **STIMAnalytics** is an AI-powered platform for enterprises, technology-based firms, R&D departments, marketing and new product development departments, professional experts and academic researchers to conduct advanced analytics on patents, articles and market data with ease.
- With 10+ years of experience, we offer Science, Technology, Innovation, and Market Analytics reports and services for innovative, applicable and integrated results.



Executive summary

Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Key Player's Portfolio

- **Reduction in Development Time:** AI has cut down the drug discovery timeline significantly. For example, the AI-driven discovery of a drug candidate can be accelerated from the **traditional 4–5 years to just 8 months**
- **Cost Efficiency:** The integration of AI in drug discovery is projected to **reduce costs by up to 50%**, making the development of new drugs more financially viable
- **Increase in Success Rates:** AI has improved the success rates of drug discovery. The probability of **success in early-stage drug discovery has increased from 10% to 25%** with the help of AI technologies
- **Growth of AI-Driven Companies:** Nearly 270 companies are working in the AI-driven drug discovery industry, with more than 50% based in the United States. However, key hubs are emerging in Western Europe and Southeast Asia
- **Long-Term Projections:** Research suggests that investments in AI-driven drug discovery companies **have tripled over the past four years**, reaching **\$24.6 billion in 2022**, indicating a significant opportunity for growth in this sector⁶

Executive summary

Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Key Player's Portfolio

Executive summary

In this report, 1087 patents have been examined, of **which 238 are active and 742 are pending**. This shows the large number of patents requested in the last 3 years. Also, the three organizations including University of California, Peptilogics and Genentech Inc are the pioneers in patent registration in this field.

The US leads the world in patent registrations with 465 patents, followed by China with 173 patents. Most of the top applicants across all regions are big tech companies.

Also, Z Advanced Computing has the largest number of highly-cited patents, which is a sign of the high value of this company's patents. The main themes of the patents represent the thematic focus of patents on areas such as drug, data model, protein, drug and design. In addition, "ICT specially adapted for biostatistics; ICT specially adapted for bioinformatics-related machine learning or data mining, e.g. knowledge discovery or pattern finding" and "Computing arrangements based on biological models" are the top technology areas in this field. In addition, three main patent applicant companies were examined separately.



The Report Scope

This report covers:

- The trend of technology development in this field
- The patenting activities of various applicants
- The focused industries
- The top applicants

This report does not cover:

- A specific patent(s) analysis
- A detailed market analysis based on other sources besides patents
- A decision making suggestion

For more information, visit the STIMAnalytics.net website.

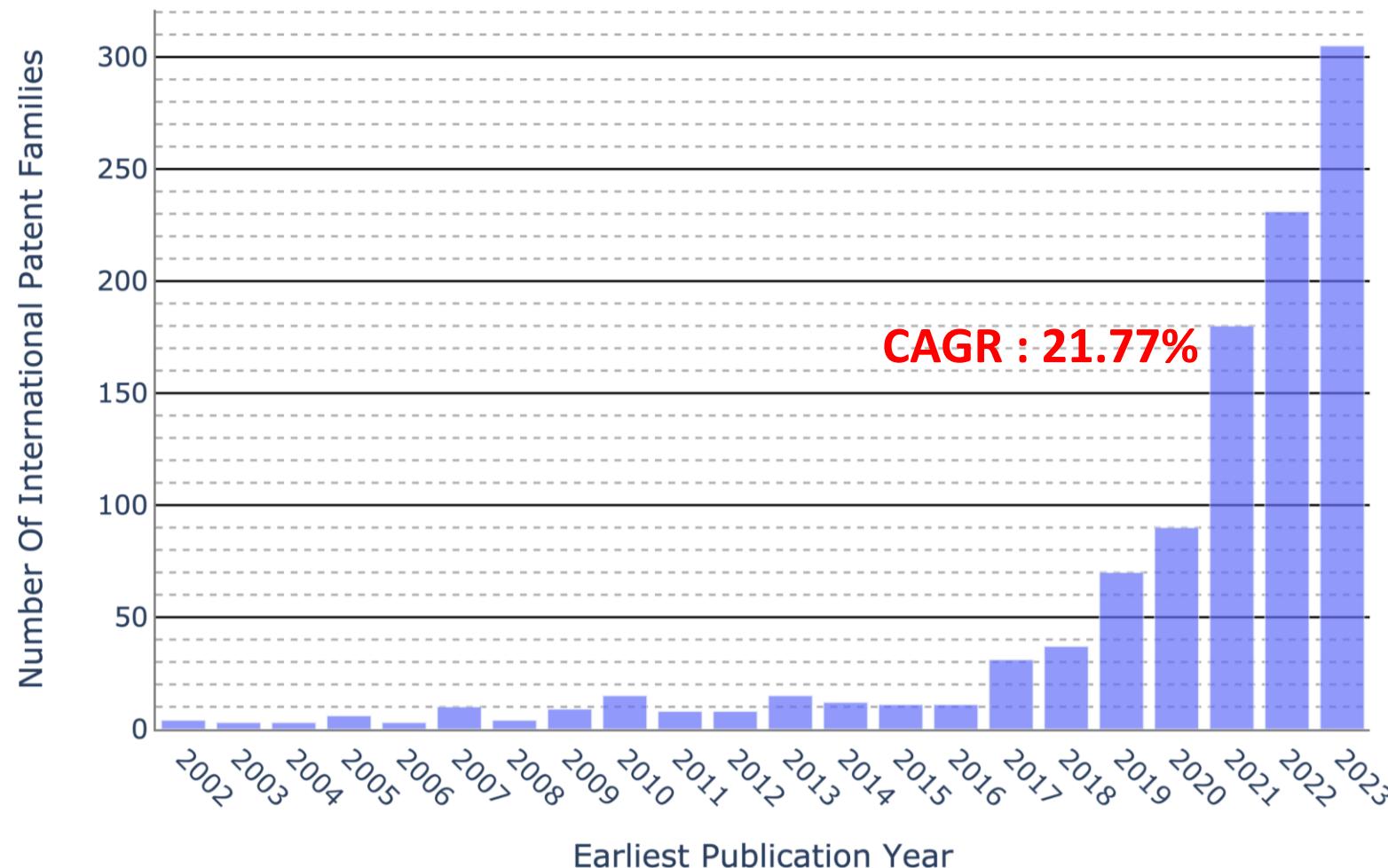


Patent Landscape Overview

[Executive summary](#)[Introduction](#)[**Patent Landscape overview**](#)[Technology Analysis](#)[Market Analysis](#)[Key Player's Portfolio](#)

Patent Family

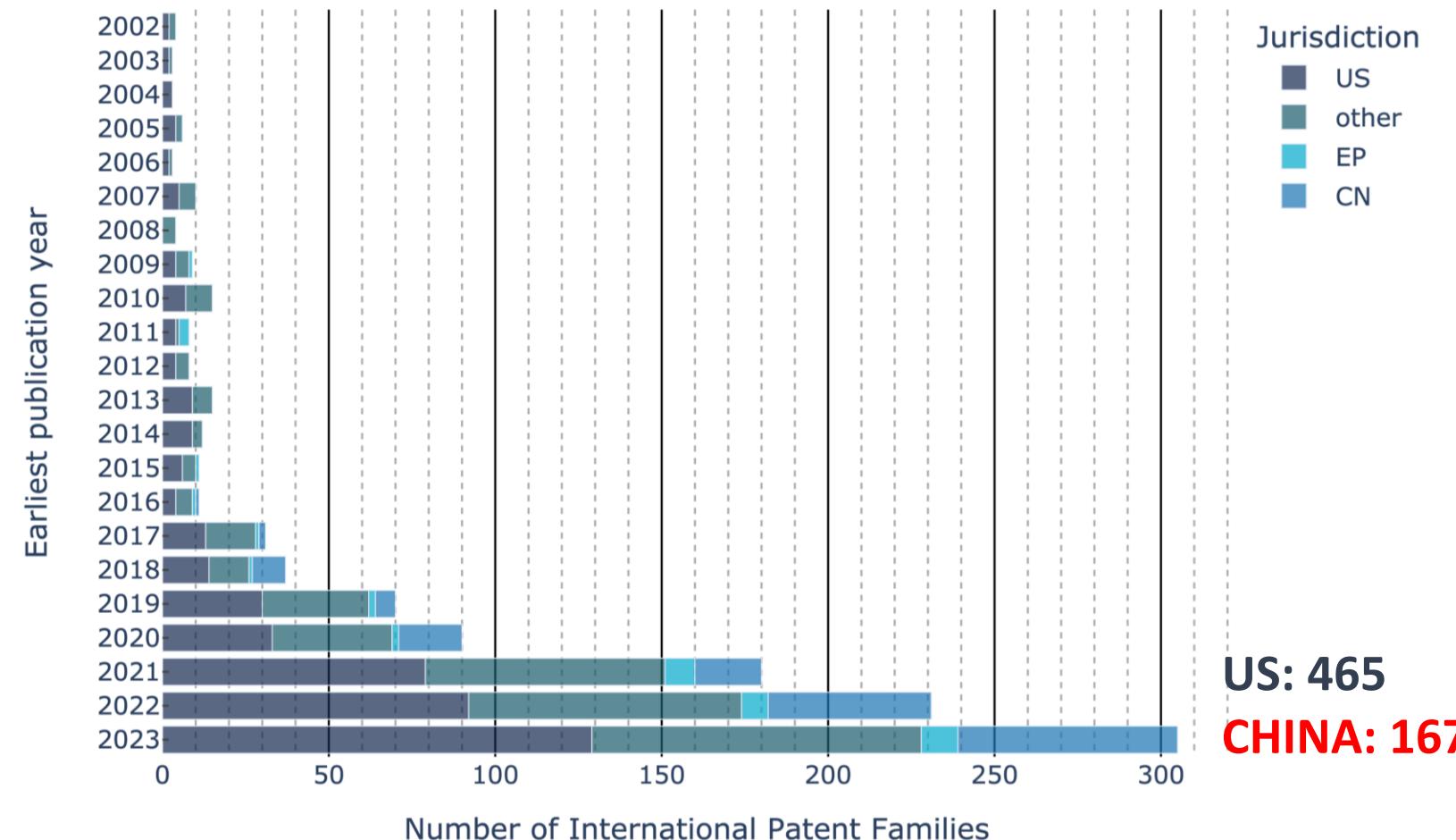
An examination of patents within the AI in biotechnology industries reveals that a total of 1087 patents were filed from 2002 to 2023. The rate of patent applications in this sector is steadily rising, showing a significant compound annual growth rate (CAGR) of 21.77%.



[Executive summary](#)[Introduction](#)[Patent Landscape overview](#)[Technology Analysis](#)[Market Analysis](#)[Key Player's Portfolio](#)

Patent-Market Coverage

The United States maintains its position at the forefront of global patent registrations, marked by a notable increase over the years. China holds the second-highest number of patent filings, with Europe trailing as the region with the least number of registrations in this period.



Executive summary

Introduction

Patent Landscape overview

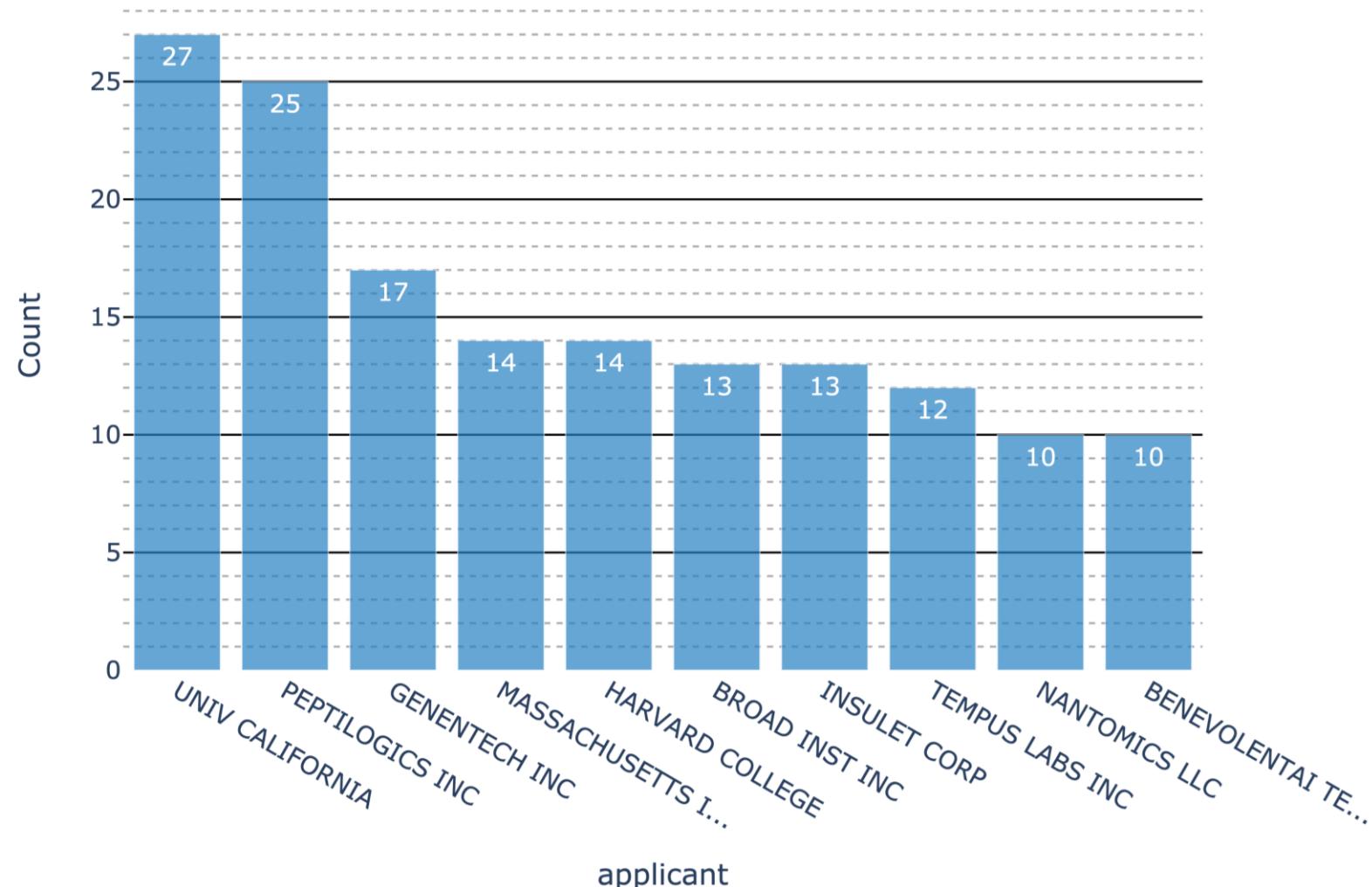
Technology Analysis

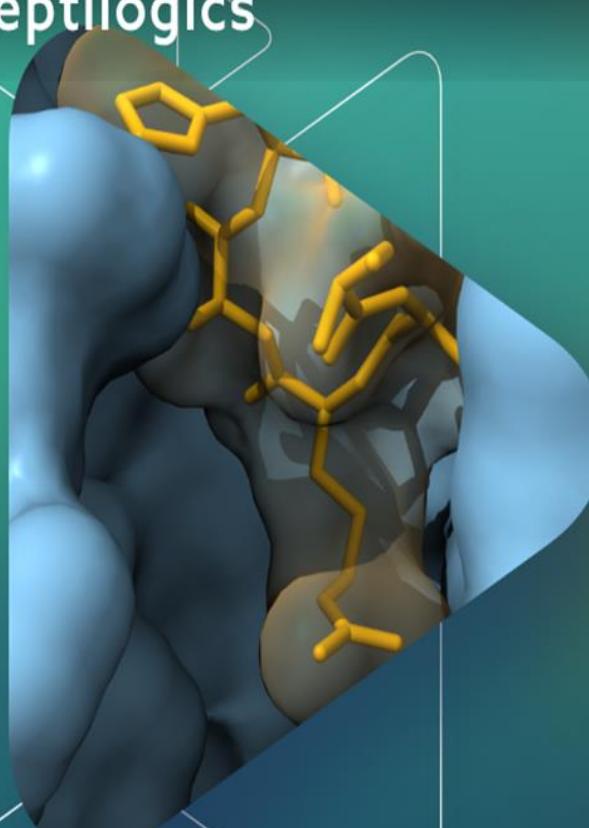
Market Analysis

Key Player's Portfolio

Top applicants

The patent applicants are mostly corporations, but some of them are universities, with California University being the most prolific one..





novel peptide therapeutics

engineer peptides

RECREATING THE FUTURE OF PEPTIDE THERAPEUTICS

Our goal is to revolutionize the discovery process for novel peptide therapeutics for patients with serious and life-threatening diseases. Combining the untapped potential of peptide biology with the power of machine learning, Peptilogics approaches drug design at massive scale, creating the next generation of medicines through precision engineering and design.

They have developed a computational platform that accelerates the discovery and development of peptide therapeutics

INVESTORS

THIEL

PRESIGHT



FOUNDERS FUND

CARB-X

PARTNERS

We are always speaking with innovative partners to help translate great science into important medicines.

Email us at partners@peptilogics.com to explore partnership opportunities with Peptilogics.

NATIONAL INSTITUTE
OF ALLERGY AND
INFECTIOUS DISEASES



CYSTIC
FIBROSIS
FOUNDATION





Combating Antibiotic-Resistant Bacteria



BOSTON
UNIVERSITY

ABOUT CARB-X • PORTFOLIO • PARTNERS • APPLY • RESOURCES • **NEWS** • EVENTS

CARB-X FUNDS PEPTILOGICS TO DEVELOP A NEW CLASS OF ANTIBIOTICS TO TREAT SERIOUS SUPERBUG INFECTIONS ASSOCIATED WITH IMPLANTS

Peptilogics' engineered cationic antibiotic peptide is designed to kill multi-drug-resistant bacteria rapidly, transforming the way prosthetic joint infections (PJI) are treated

Peptilogics Closes \$35.4 Million Series B Financing to Further Advance Proprietary Computational Peptide Drug Design and Discovery Platform



Peptilogics' computational design platform accelerates the discovery and development of peptide therapeutics

July 12, 2022

ORION BIOTECHNOLOGY AND PEPTILOGICS ENTER STRATEGIC RESEARCH COLLABORATION TO ENABLE AI-DRIVEN DRUG DISCOVERY AGAINST UNDRUGGED GPCR TARGET

EpiAxis & Peptilogics enter strategic drug discovery partnership

by EpiAxis | Aug 15, 2022 | News

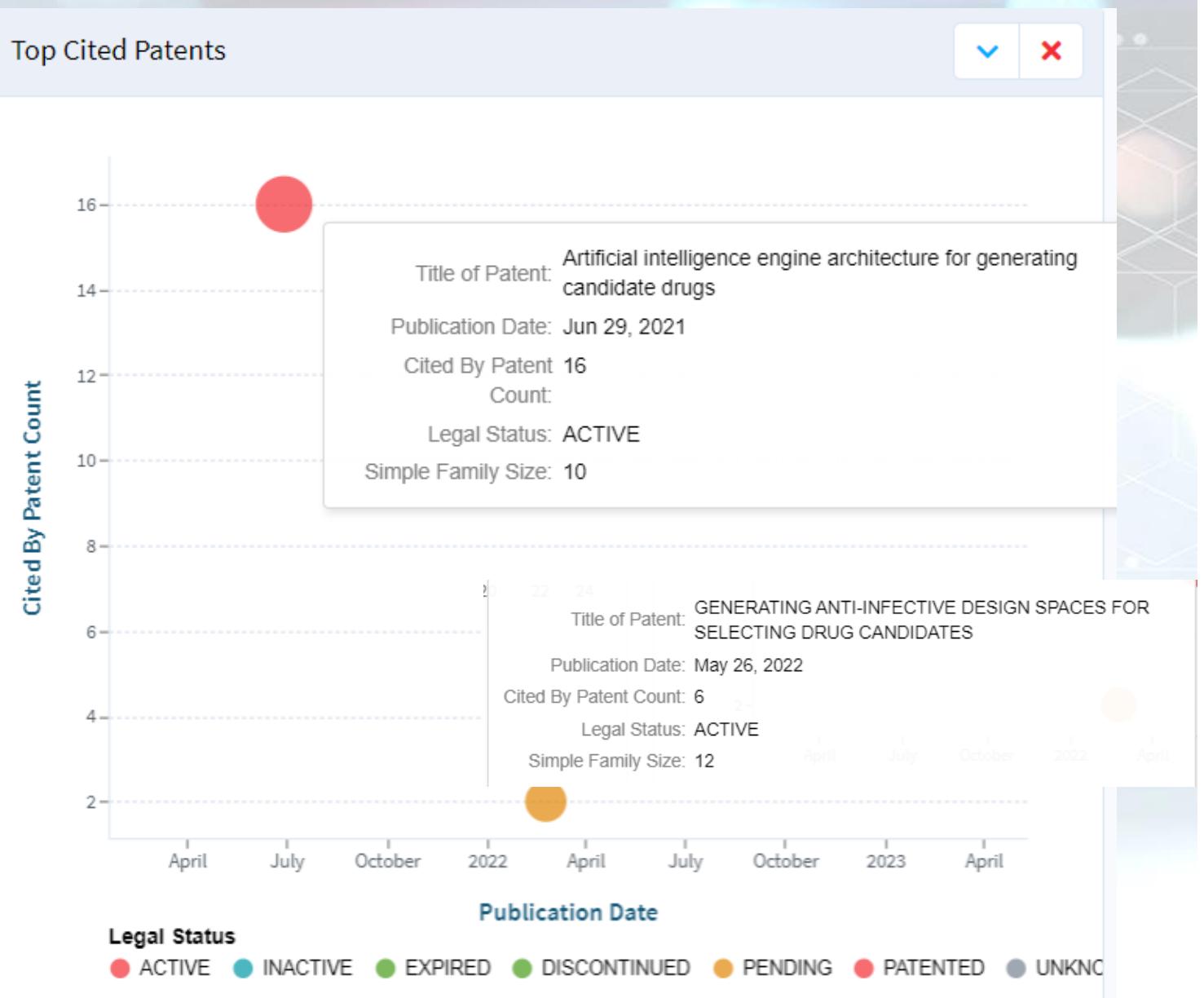


EpiAxis Therapeutics and Peptilogics, a biotech company engineering peptide therapeutics by combining computation and biology to improve the treatment landscape for patients with life-threatening diseases, announced today that they have entered a collaboration to leverage AI for drug discovery to inhibit epigenetic oncology targets, aiming to reprogram cancer cells and drive immune reinvigoration.

PEPTILOGICS INC

Generating Candidate Drug

Computer Representations Of
Peptides For Efficient Design Of
Drug Candidates





A Member of the Roche Group



A Member of the Roche Group



Harnessing the Power of AI

BUILDING A NEXT-GENERATION DRUG DISCOVERY PLATFORM

Across Genentech and the Roche Group, we've built massive, robust datasets sourced from decades of laboratory and clinical research and used them to train powerful AI models that help us solve formerly intractable problems every day. To enhance the capacity and speed of our ongoing and planned efforts, in November 2023, we announced a [collaboration with](#)

[NVIDIA](#).

Using our unique

leading, next-generation d

Strategic Partnership with NVIDIA

Through the collaboration using the power of our proprietary ML algorithms, including platforms like NVIDIA BioNeMo that scale generative AI applications in drug discovery.

Similar to what has occurred in areas like gaming, search engines, and text-to-image generation, generative AI is acting as a catalyst in healthcare, and our collaboration with NVIDIA is helping us to amplify our "lab in a loop" framework. This boost in computing power could ultimately speed up our drug development process and improve the success rate of R&D.

Redefining Drug Discovery with AI

PARTNERING ON A REVOLUTIONARY NEW APPROACH

Advanced computation is a multifaceted and rapidly evolving field. To supplement our internal efforts and stay at the leading edge of the field, Genentech and Roche have also been engaging with external collaborators.

In December 2021, Roche and Genentech entered into a collaboration with Recursion Pharmaceuticals to explore new territories of cell biology and develop new treatments in key areas of neuroscience and an oncology indication. The partnership will leverage Recursion's technology-enabled drug discovery platform in combination with our extensive [single-cell data](#) generation and ML capabilities to cast a wide, comprehensive net for novel drug targets, and advance and expedite the development of small molecule medicines.

Leveraging generative AI to accelerate drug discovery and development with NVIDIA

AVIV REGEV

*Head of Genentech
Research and Early
Development (gRED)*

JOHN MARIONI

*Senior Vice President and
Head of Computational
Sciences, gRED*



Simplifying

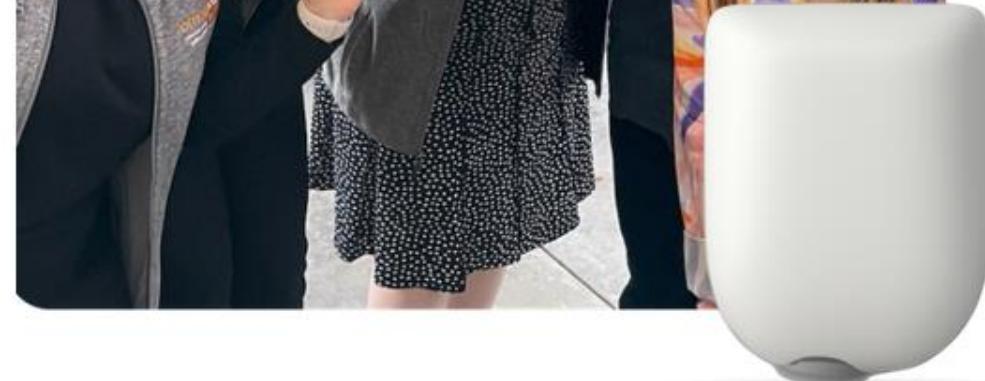
Smart Drug Delivery

Life Simplified.

Strategic Partnerships: Amgen and Ferring Pharmaceuticals to expand their technology past insulin delivery.

Big Data: Insulet Corp's recent patents focus on using [REDACTED] processors to access blood glucose and insulin data to identify patterns and apply rules to these events.

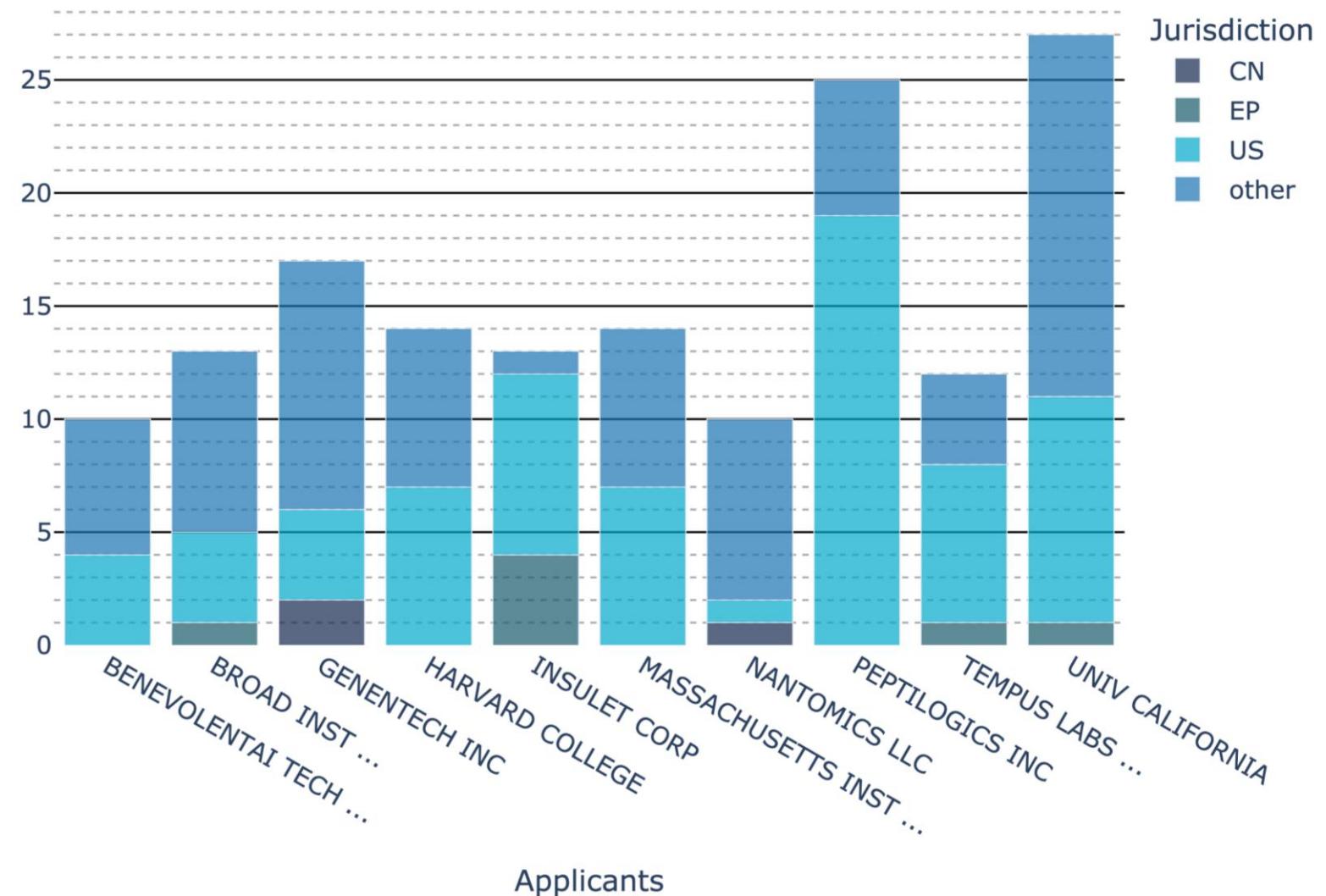
<https://www.insulet.com>



[Executive summary](#)[Introduction](#)[Patent Landscape overview](#)[Technology Analysis](#)[Market Analysis](#)[Key Player's Portfolio](#)

Market Coverage of Top Applicants

The US market holds significant importance for key applications, leading companies to prioritize targeting it due to its attractive nature and robust intellectual property rights.



Executive summary

Introduction

Patent Landscape overview

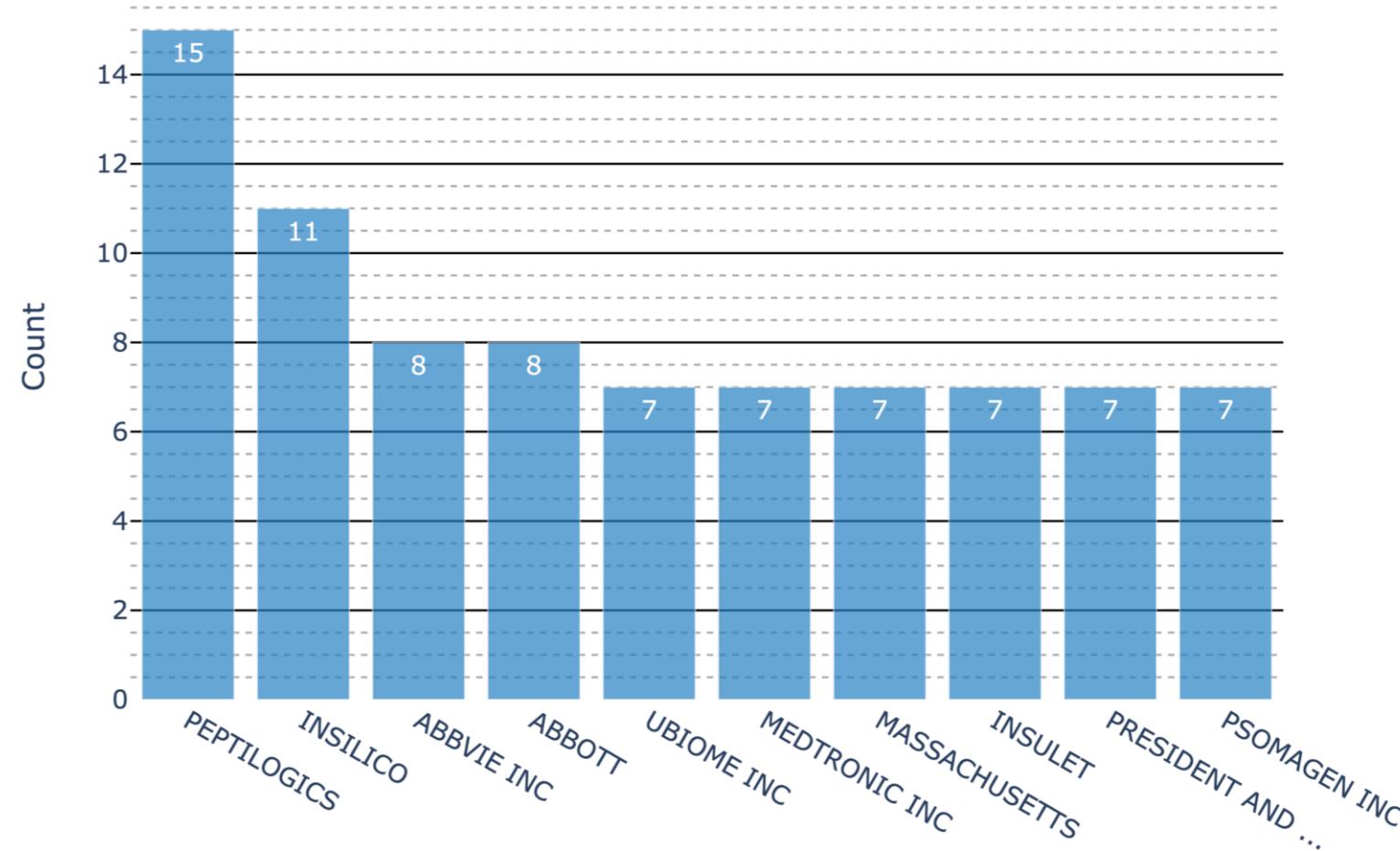
Technology Analysis

Market Analysis

Key Player's Portfolio

Top owners

Patent owners may not always be the same as the applicants. Typically, the owners are the primary beneficiaries of patents. In the realms of AI in biotechnology, PEPTILOGICS holds the most extensive patent portfolio, followed by INSILICO and ABBVIE INC.



Executive summary

Introduction

Patent Landscape overview

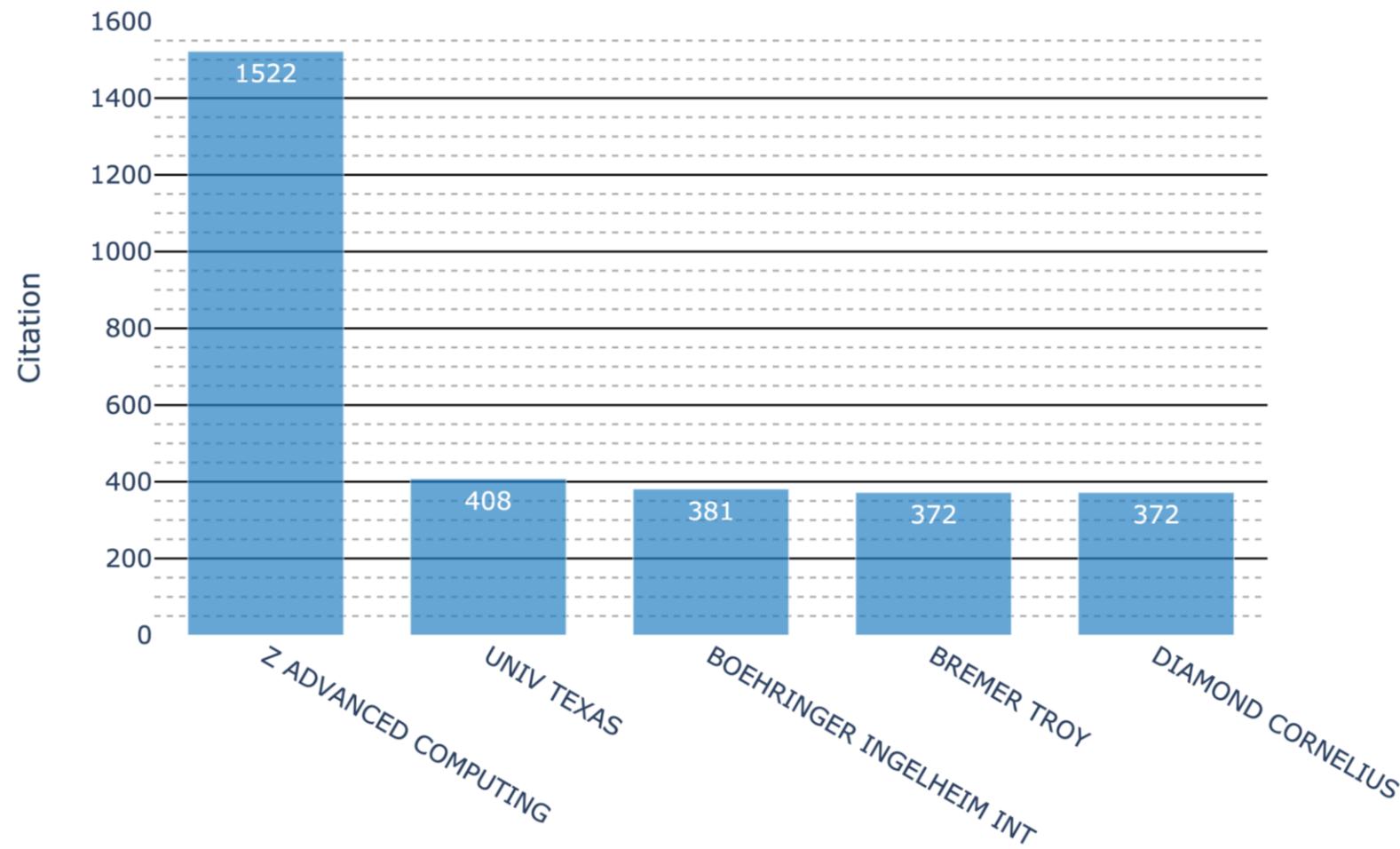
Technology Analysis

Market Analysis

Key Player's Portfolio

Highly-Cited Applicants

Z Advanced Computing holds the highest number of citations with 1522, followed by Texas University and Boehringer Ingelheim International. The significant number of citations for Z Advanced Computing's patents reflects the high value attributed to their registered patents.



Technology Analysis

Executive summary

Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio

1- PREDICT & identify

- AI can be used to virtually screen and optimize compounds, estimate their bio-activities, and predict protein-drug interactions.
- Identify compounds with a high probability of binding to a target protein

Bio data: PubChem, ChEMBL, DrugBank, ZINC, BindingDB, ADME,

STITCH

Chemical Data: PDB, UniProt, Atom3D, MoleculeNet
2- Molecular Generation

- AI algorithms, particularly generative models, can **propose novel molecular structures** for potential drugs.

Executive summary

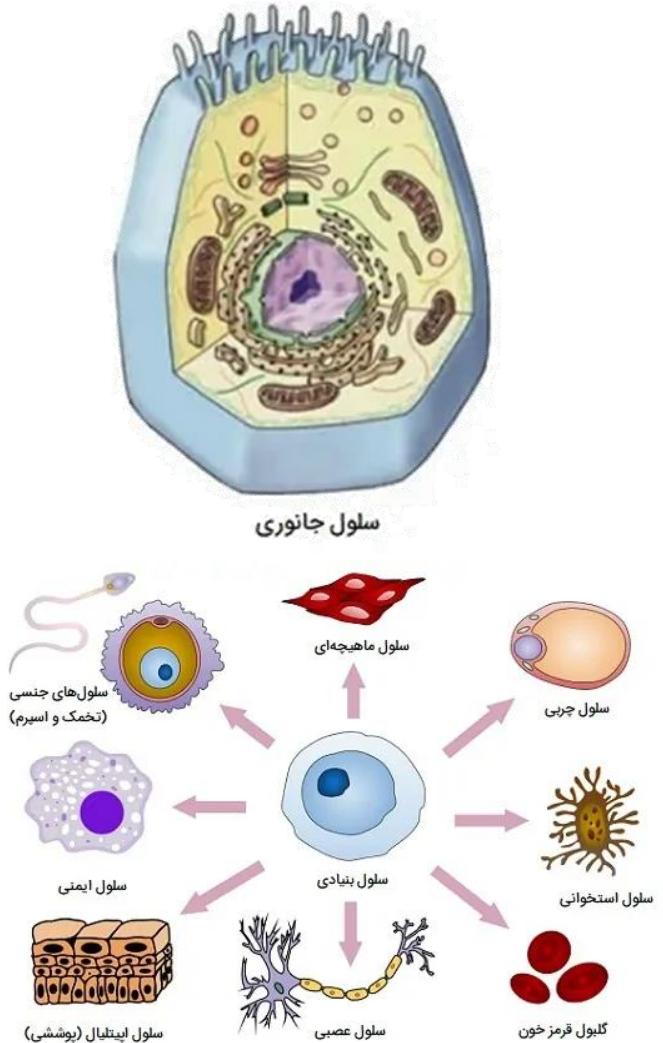
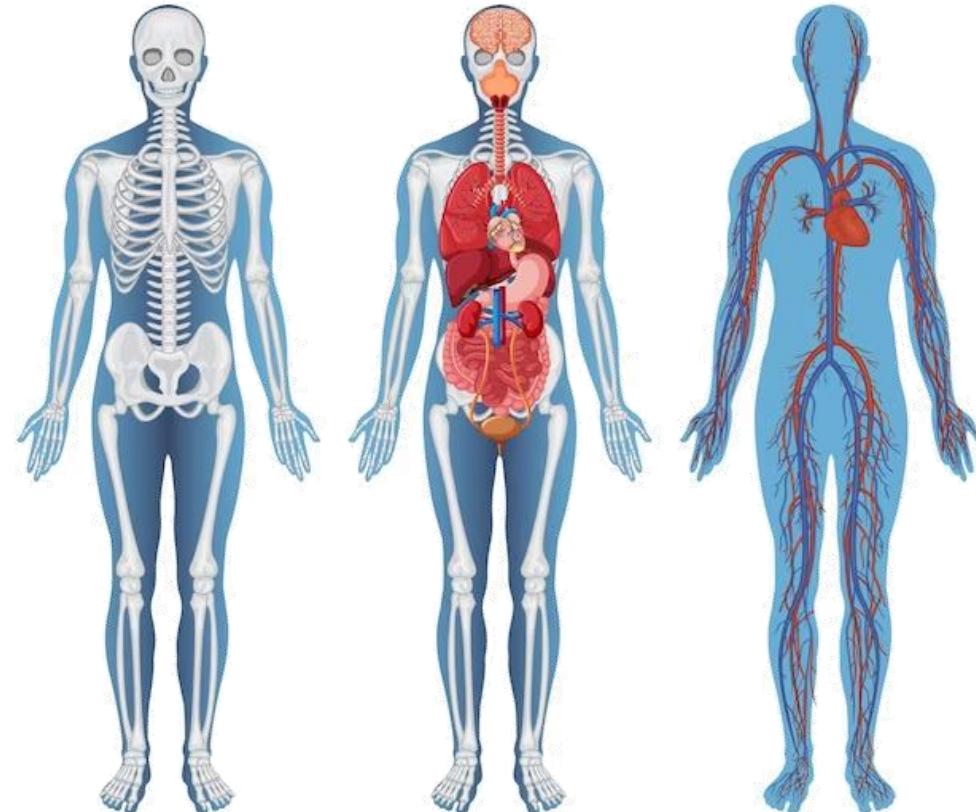
Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio



28 to 36 trillion cell in the body

Executive summary

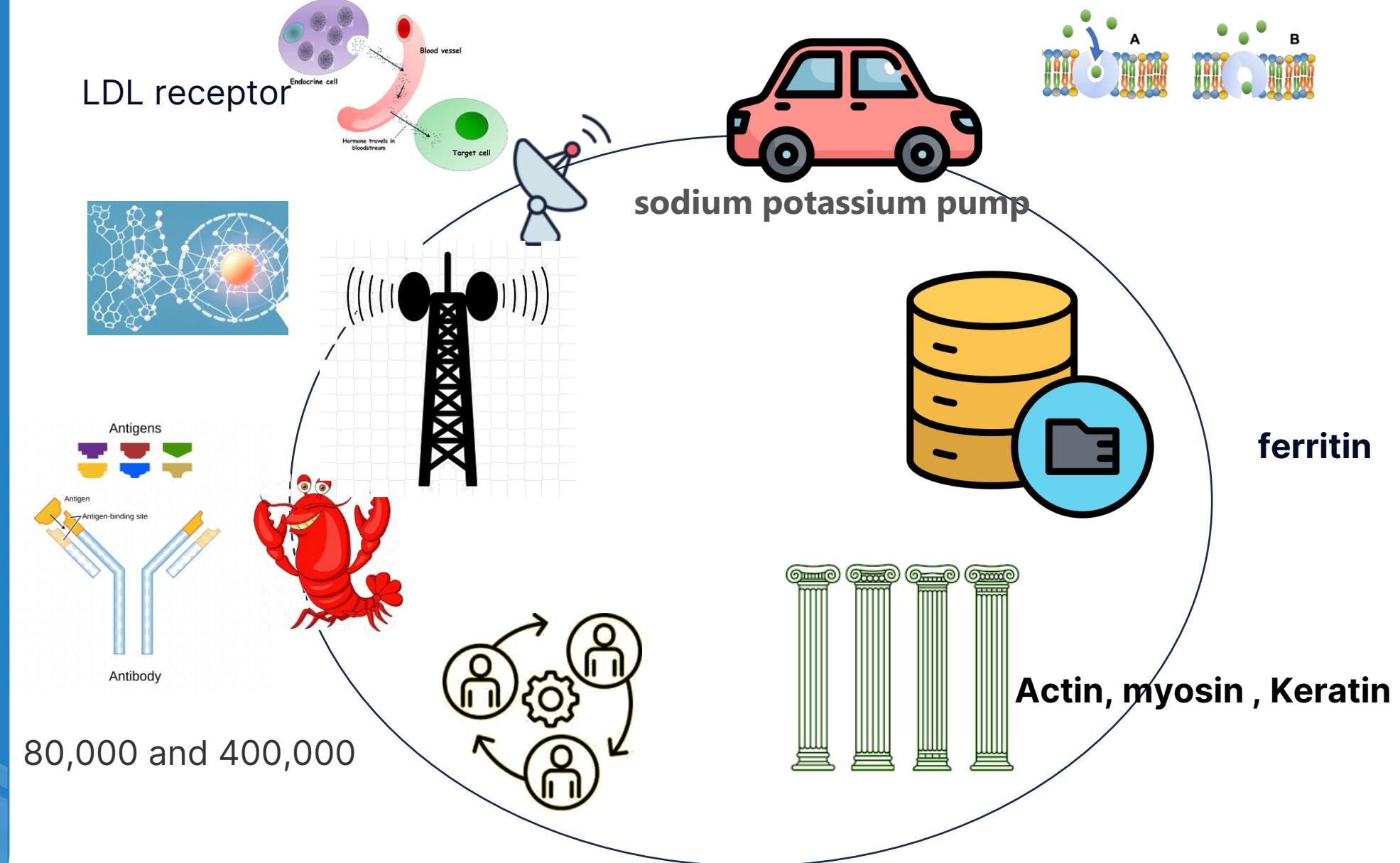
Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio



Executive summary

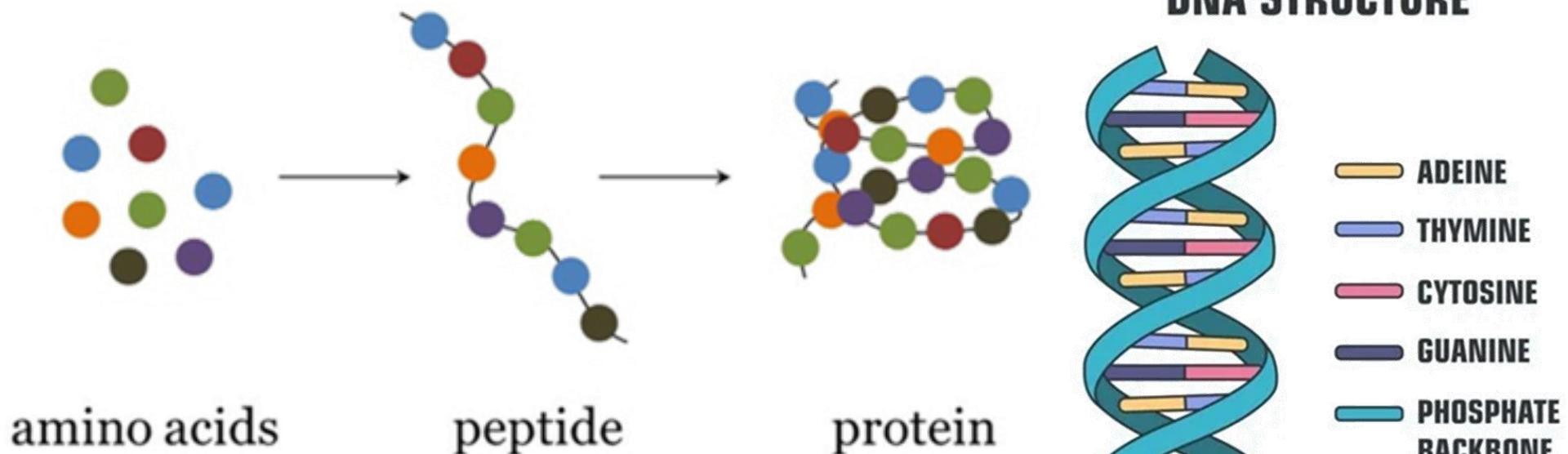
Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio



Executive summary

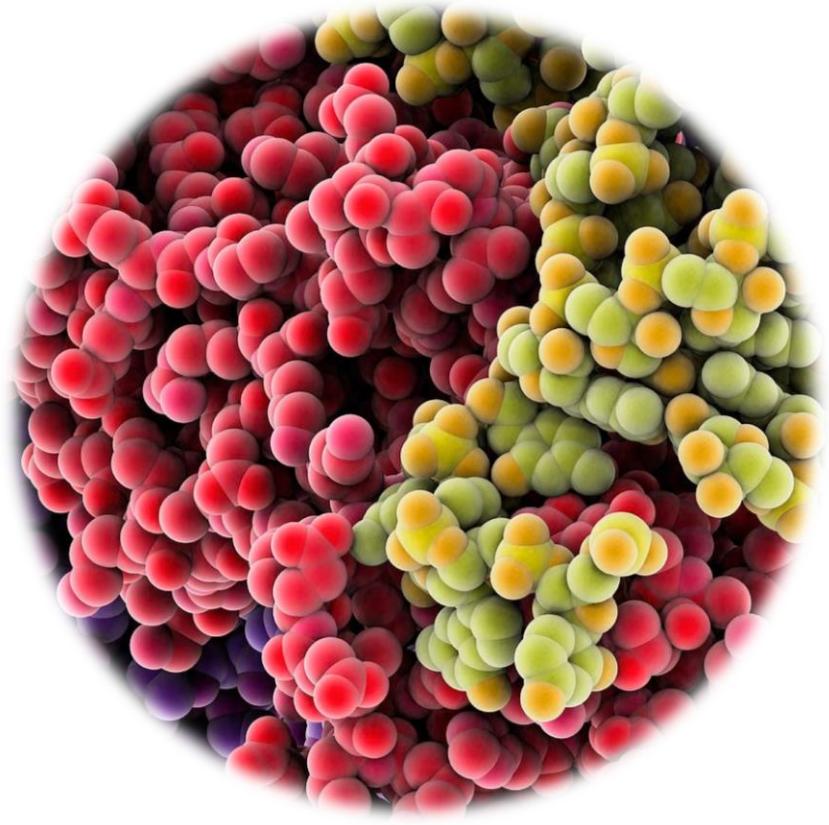
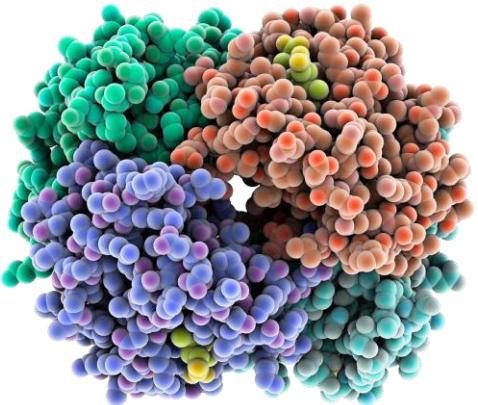
Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio



protein folding problem,

learn the language of life

Executive summary

Introduction

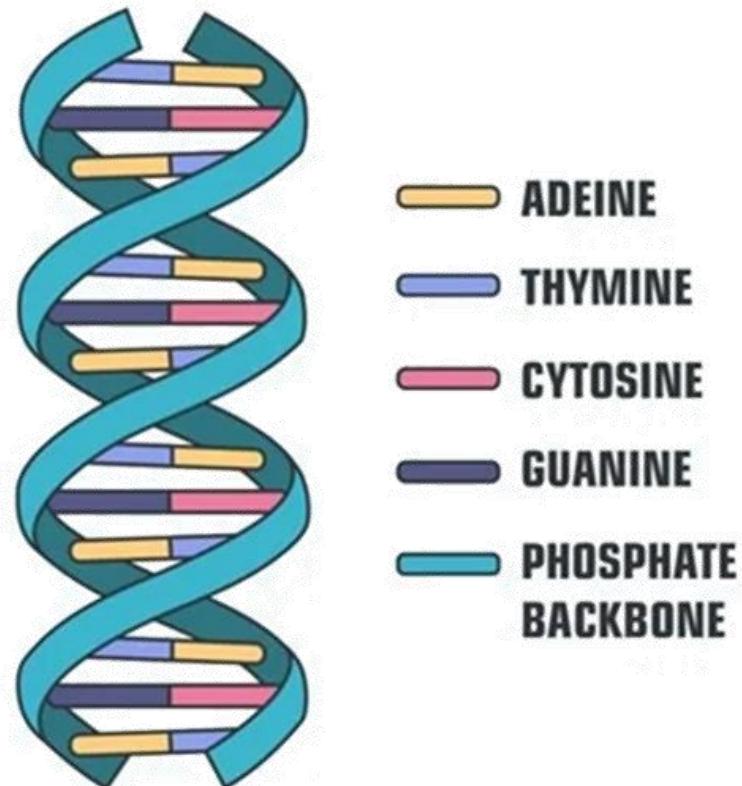
Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio

DNA STRUCTURE



Aphabet deep mind : multiple sequence alignment (MSA)

Meta: ESM-2 and ESMFold

Protein Language Model

Large language models generate functional protein sequences across diverse families

Ali Madani , Ben Krause, Eric R. Greene, Subu Subramanian, Benjamin P. Mohr, James M. Holton, Jose Luis Olmos Jr., Caiming Xiong, Zachary Z. Sun, Richard Socher, James S. Fraser & Nikhil Naik 

Nature Biotechnology 41, 1099–1106 (2023) | [Cite this article](#)

75k Accesses | 121 Citations | 1088 Altmetric | [Metrics](#)

Executive summary

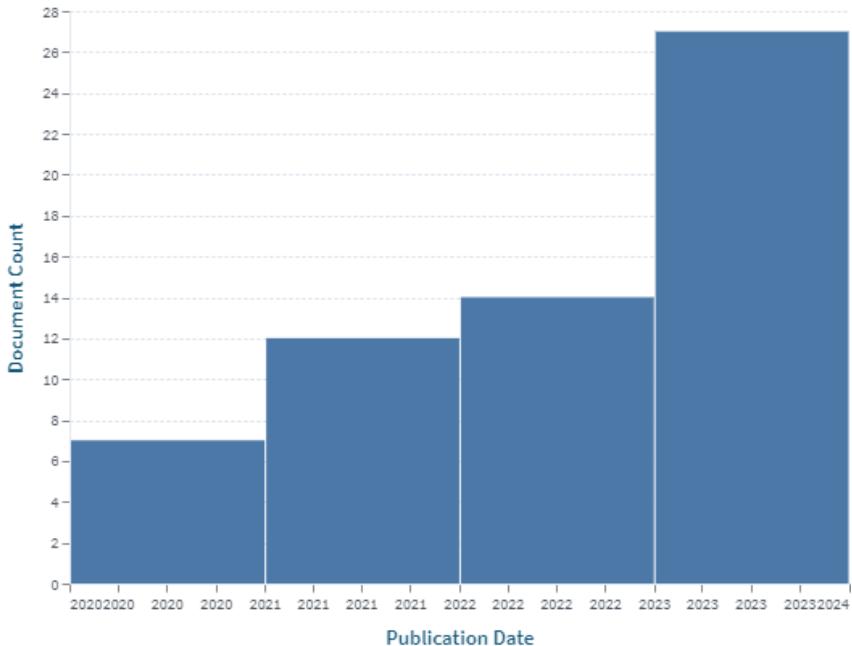
Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio



DeepMind

18 G06F18/24147 Physics Distances to closest patterns, e.g. nearest neighbour	18 G06N20/00 Physics Machine learning	20 G06N3/044 Physics Recurrent networks, e.g. Hopfield networks	58 G06N3/045 Physics Combinations of networks	22 G06N3/047 Physics Probabilistic or stochastic networks
30 G06N3/08 Physics Learning methods	22 G06N3/084 Physics Backpropagation, e.g. using gradient descent	6 G06N3/088 Physics Non-supervised learning, e.g. competitive learning	53 G16B15/20 Physics Protein or domain folding	32 G16B15/30 Physics Drug targeting using structural data Docking or binding prediction
8 G16B30/00 Physics ICT specially adapted for sequence analysis involving	8 G16B30/10 Physics Sequence alignment Homology search	55 G16B40/20 Physics Supervised data analysis	18 G16H10/40 Physics for data related to laboratory analysis, e.g. patient specimen	19 G16H50/20 Physics for computer-aided diagnosis, e.g. based on medical expert

ICT specially adapted for analysing two-dimensional or three-dimensional molecular structures, e.g. structural or functional relations or structure alignment

Protein or domain folding

Executive summary

Introduction

Patent Landscape overview

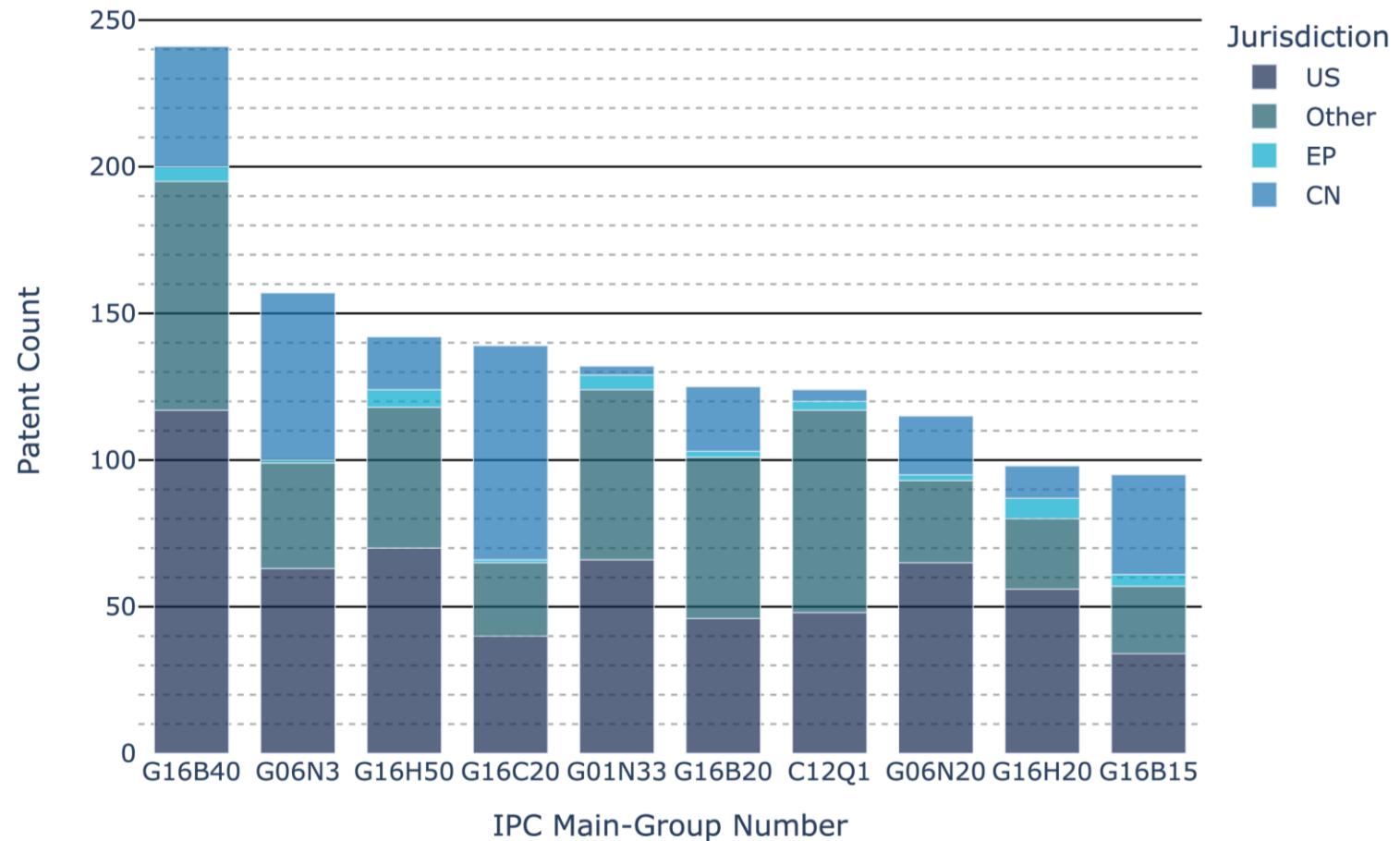
Technology Analysis

Market Analysis

Top Player's Portfolio

Top technologies by main-group

As it is known, “ICT specially adapted for biostatistics; ICT specially adapted for bioinformatics-related machine learning or data mining, e.g. knowledge discovery or pattern finding ” with code G16B40 is at the top, then there is “Computing arrangements based on biological models”.



Executive summary

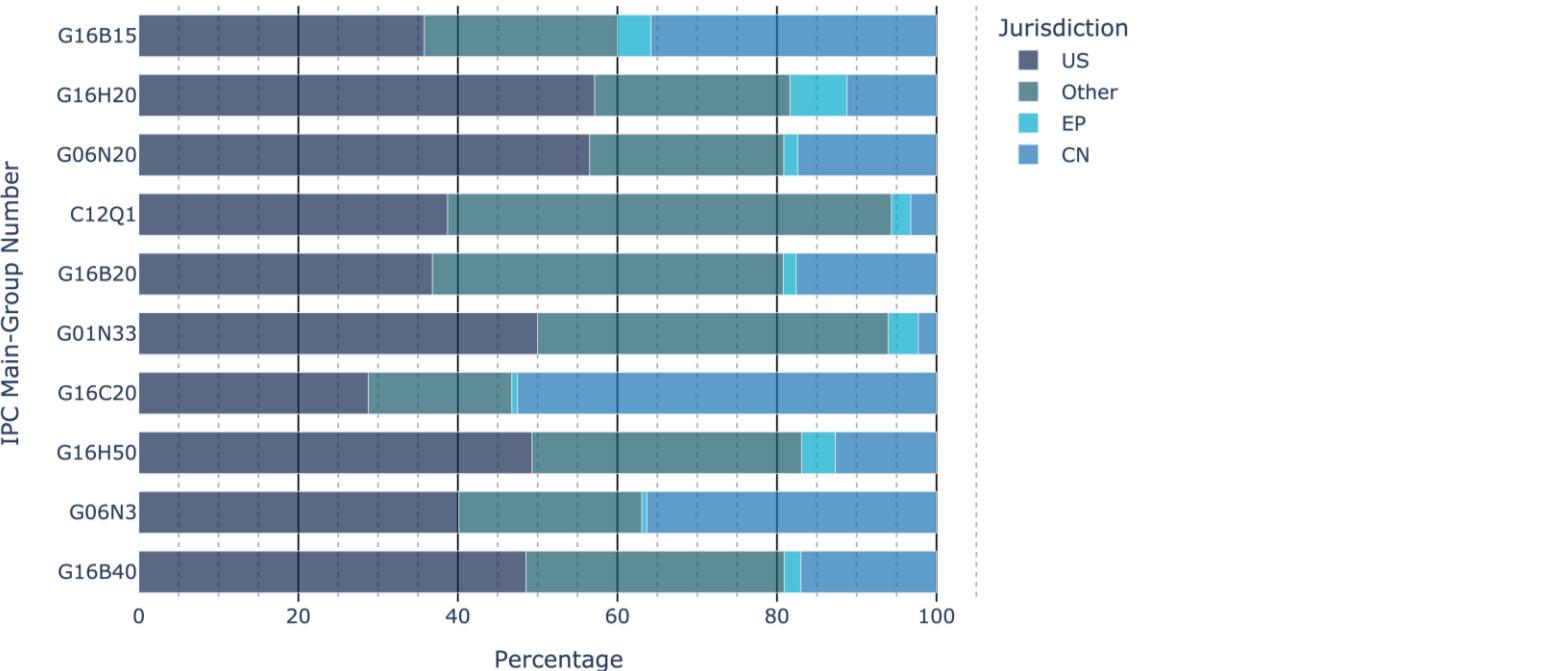
Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio



G16B40	ICT specially adapted for biostatistics ; ICT specially adapted for bioinformatics-related machine learning or data mining, e.g. knowledge discovery or pattern finding	G16B20	ICT specially adapted for functional genomics or proteomics , e.g. genotype-phenotype associations
G06N3	Computing arrangements based on biological models	C12Q1	Measuring or testing processes involving enzymes, nucleic acids or microorganisms (measuring or testing apparatus with condition measuring or sensing means, e.g. colony counters, C12M 1/34); Compositions therefor; Processes of preparing such compositions
G16H50	ICT specially adapted for medical diagnosis, medical simulation or medical data mining ; ICT specially adapted for detecting, monitoring or modelling epidemics or pandemics	G06N20	Machine learning
G16C20	Chemoinformatics , i.e. ICT specially adapted for the handling of physicochemical or structural data of chemical particles, elements, compounds or mixtures	G16H20	ICT specially adapted for therapies or health-improving plans, e.g. for handling prescriptions, for steering therapy or for monitoring patient compliance
G01N33	Investigating or analysing materials by specific methods not covered by groups G01N 1/00-G01N 31/00	G16B15	ICT specially adapted for analysing two-dimensional or three-dimensional molecular structures , e.g. structural or functional relations or structure alignment

Executive summary

Introduction

Patent Landscape overview

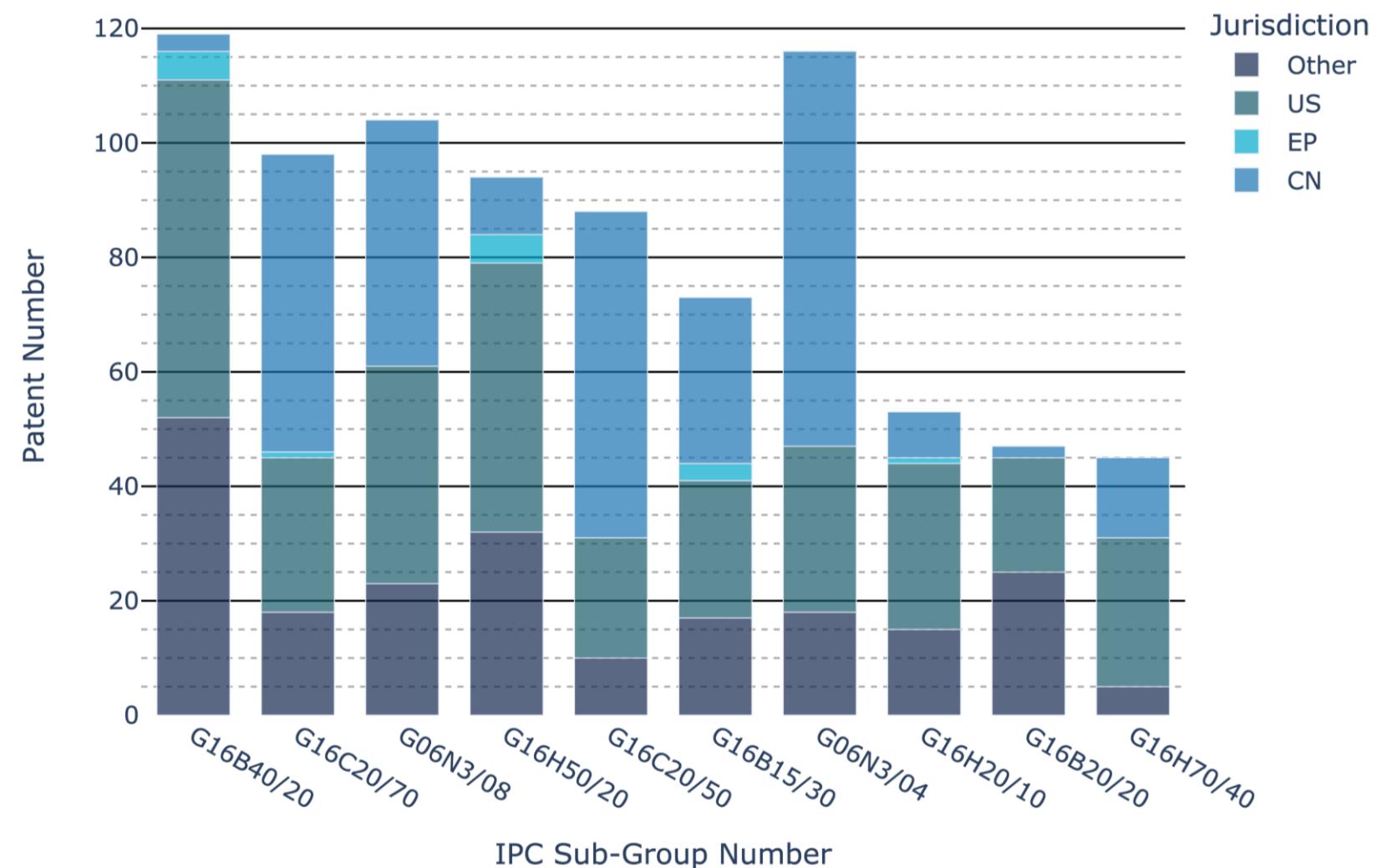
Technology Analysis

Market Analysis

Top Player's Portfolio

Top technologies by sub-group

As it is shown, “Supervised data analysis “ with code G16B40/20 is at the top, then there is “Architecture, e.g. interconnection topology” .



Executive summary

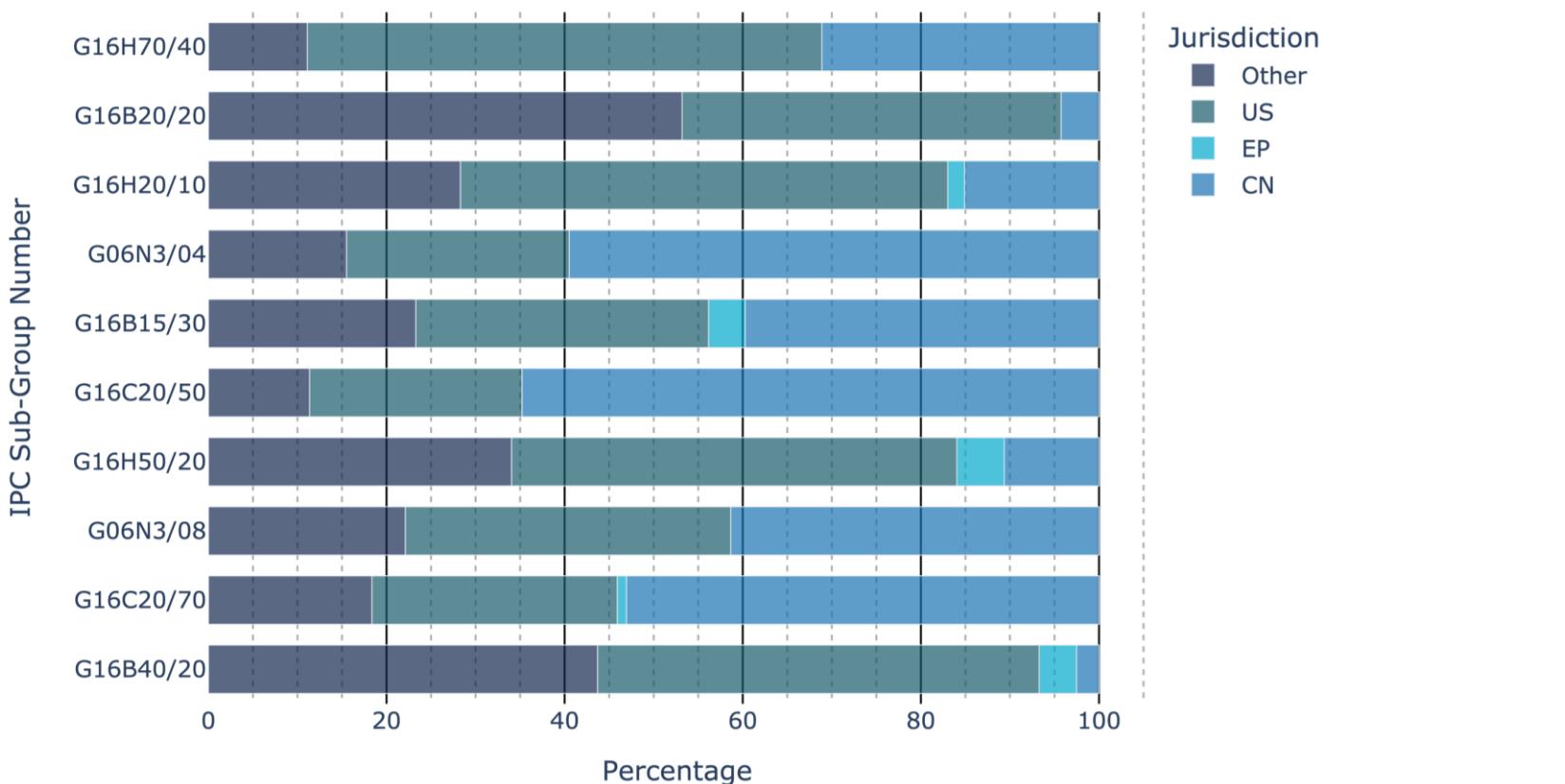
Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio



G16B40/20	ICT specially adapted for biostatistics ; ... (Supervised data analysis)	G16B15/30	Drug targeting using structural data ; Docking or binding prediction
G06N3/04	Computing arrangements based on biological models (Architecture , e.g. interconnection topology)	G16C20/50	Molecular design, e.g. of drugs
G06N3/08	Computing arrangements based on biological models (Learning methods)	G16H20/10	ICT specially adapted for therapies (relating to drugs or medications, e.g. for ensuring correct administration to patients)
G16C20/70	Chemoinformatics.... (Machine learning, data mining or chemometrics)	G16B20/20	Allele or variant detection, e.g. single nucleotide polymorphism [SNP] detection
G16H50/20	ICT specially adapted for medical diagnosis, medical simulation or medical data mining ; (for computer-aided diagnosis, e.g. based on medical expert systems)	G16H70/40	relating to drugs, e.g. their side effects or intended usage

Executive summary

Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio



G16B40/20

knowledge discovery or pattern finding

Supervised data analysis

medical simulation or medical data mining by computers



G16H/50/20

for computer-aided diagnosis, e.g. based on medical expert systems



G06N3/04

Computing arrangements based on biological models

Architecture, e.g. interconnection topology



G16C20/50

ICT specially adapted for the handling of physicochemical or structural data of chemical particles, elements, compounds or mixtures

Molecular design, e.g. of drugs

Executive summary

Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio

Five Recent dominant technologies

G16B40

Bioinformatics Specially Adapted For **Genetic Or Protein-related Data Processing** In Computational Molecular Biology- pattern finding

G16C20

Chemoinformatics: **Molecular design**, e.g. of drugs, Machine learning

G06N3

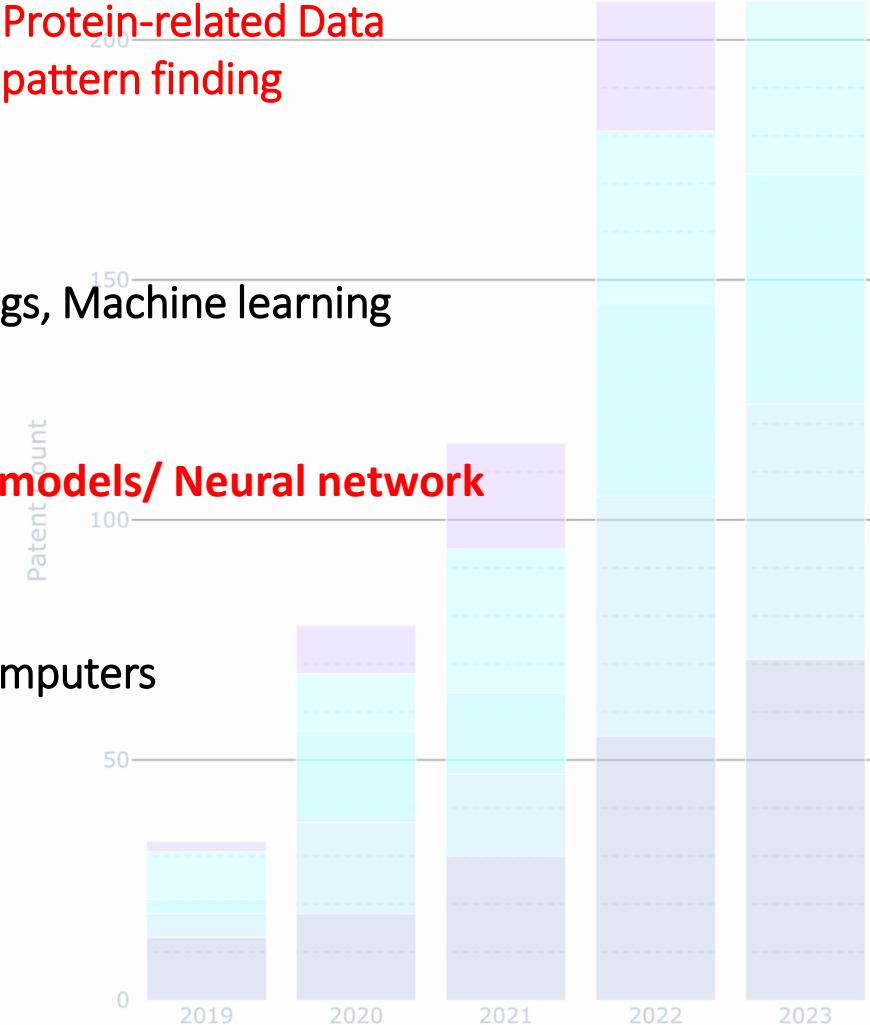
Computing arrangements based on biological models/ Neural network

G16H50

medical simulation or medical data mining by computers

G06N20

COMPUTING ARRANGEMENTS BASED ON Machine Learning



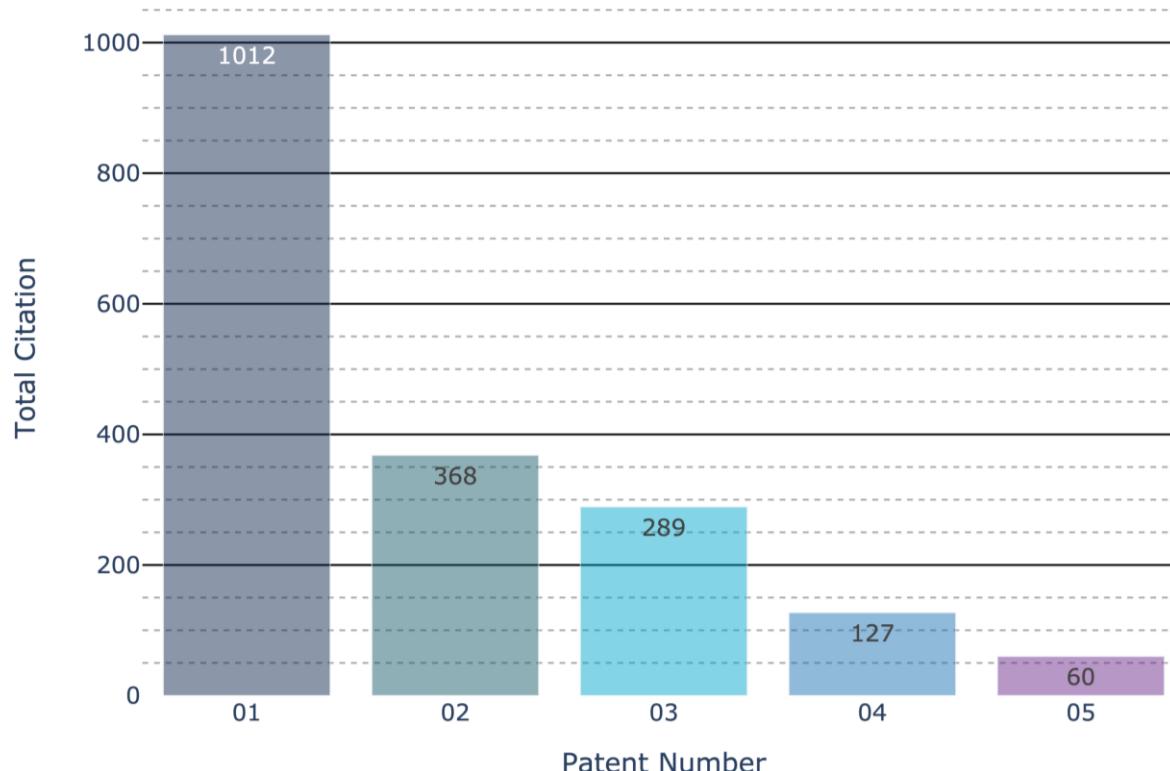
[Executive summary](#)[Introduction](#)[Patent Landscape overview](#)

Technology Analysis

[Market Analysis](#)[Top Player's Portfolio](#)

Key patents

Key patents are those that have garnered the highest number of citations over time, indicating their potential to serve as foundational patents in the field moving forward.

**US 2018/0204111 A1**

System and Method for Extremely Efficient Image and Pattern Recognition and Artificial Intelligence Platform

Applicant: Z ADVANCED COMPUTING INC

US 2020/0184278 A1

System and Method for Extremely Efficient Image and Pattern Recognition and Artificial Intelligence Platform

Applicant: Z ADVANCED COMPUTING INC

US 2013/0063550 A1

Human environment life logging assistant virtual esemplastic network system and method

Applicant: RITCHY KENNETH IRA;;RITCHY KURTIS JOHN

US 2017/0161635 A1

Generative machine learning systems for drug design

Applicant: PREFERRED NETWORKS INC

US 2009/0318480 A1

Method for treating cancer harboring egfr mutations

Applicant: BOEHRINGER INGELHEIM INT

Executive summary

Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio

Technology clustering

Within this section, AI and biotechnology patents are categorized into seven primary clusters, with the top terms identified within each cluster. Clustering not only offers insight into the key areas of focus within patents but also enables a more focused examination of individual patents.

01

Top Terms: patient, tissue, treatment, organ, data
The number of patents: 116

02

Top Terms: cell, image, stem, method, culture
The number of patents: 115

03

Top Terms: drug, model, compound, molecule, target
The number of patents: 183

04

Top Terms: disease, method, cancer, device, invention
The number of patents: 355

05

Top Terms: entity, sequence, space, set
The number of patents: 39

06

Top Terms: protein, sequence, acid, amino, variant
The number of patents: 94

07

Top Terms: data, module, image, user, drug 38
The number of patents: 170

Executive summary

Introduction

Patent Landscape overview

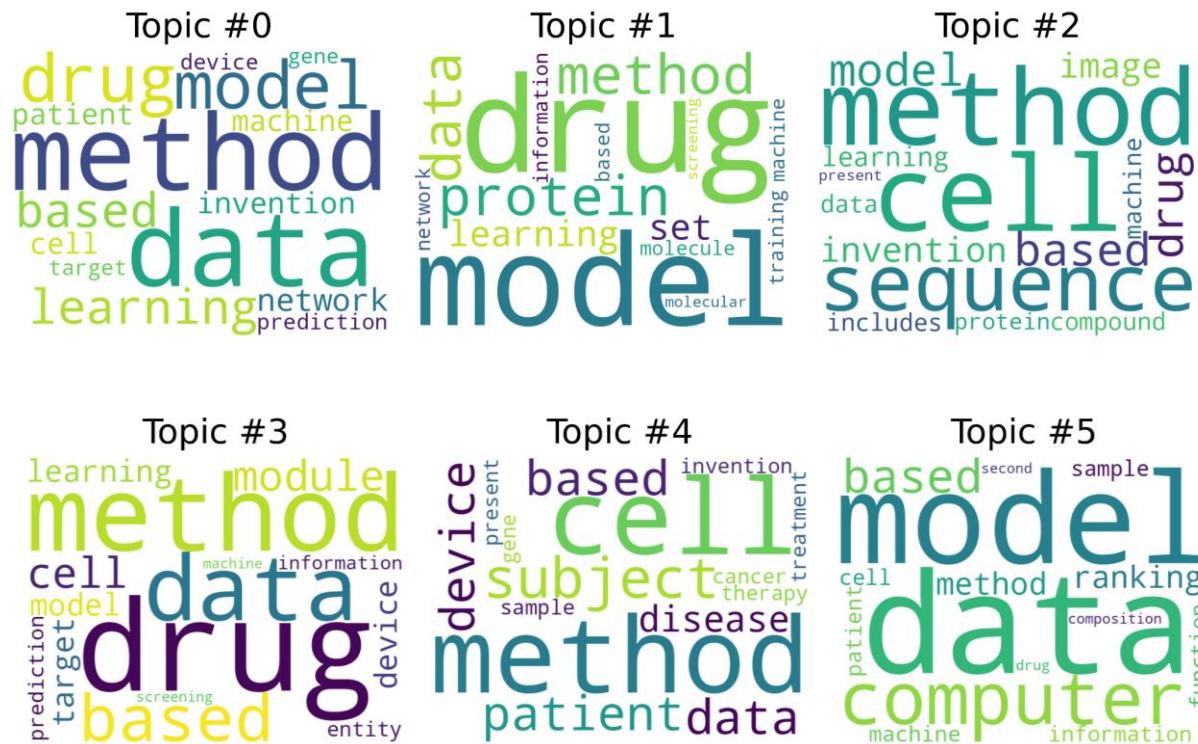
Technology Analysis

Market Analysis

Top Player's Portfolio

The main themes of patents

The frequency of topics indicates the research direction of patents on fields such as drug, cell, data, model, method and computer.



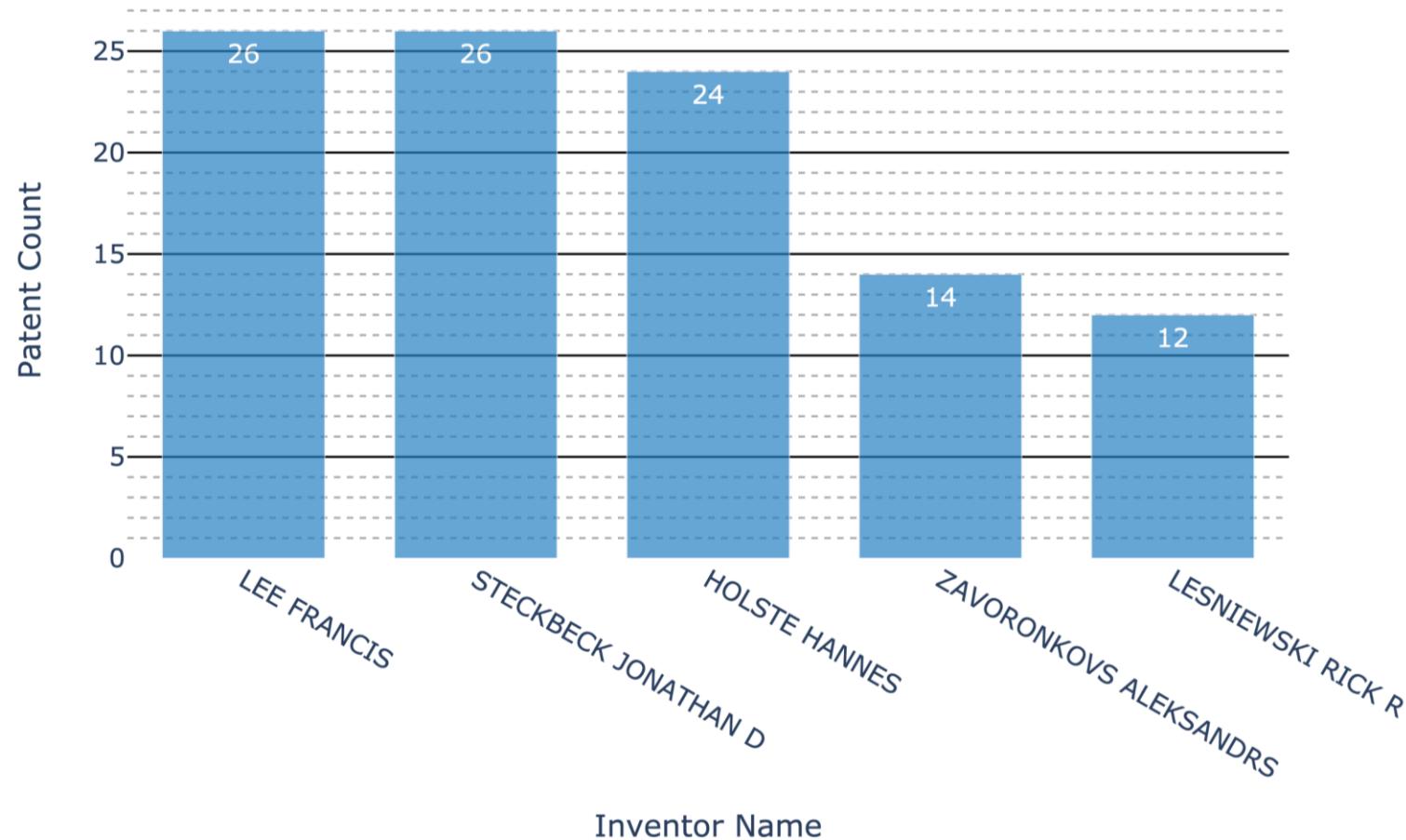
[Executive summary](#)[Introduction](#)[Patent Landscape overview](#)

Technology Analysis

[Market Analysis](#)[Top Player's Portfolio](#)

Top inventors

An inventor in patent documents is the person or persons who contribute to the claims of a patent. The claims are the part of the patent document that define the scope and boundaries of the legal protection granted by the patent. The inventor is not necessarily the same as the applicant or the owner of the patent, who may be different entities or individuals. This analysis can be beneficial to know the main scientist and technologist in this field for next technological collaborations.



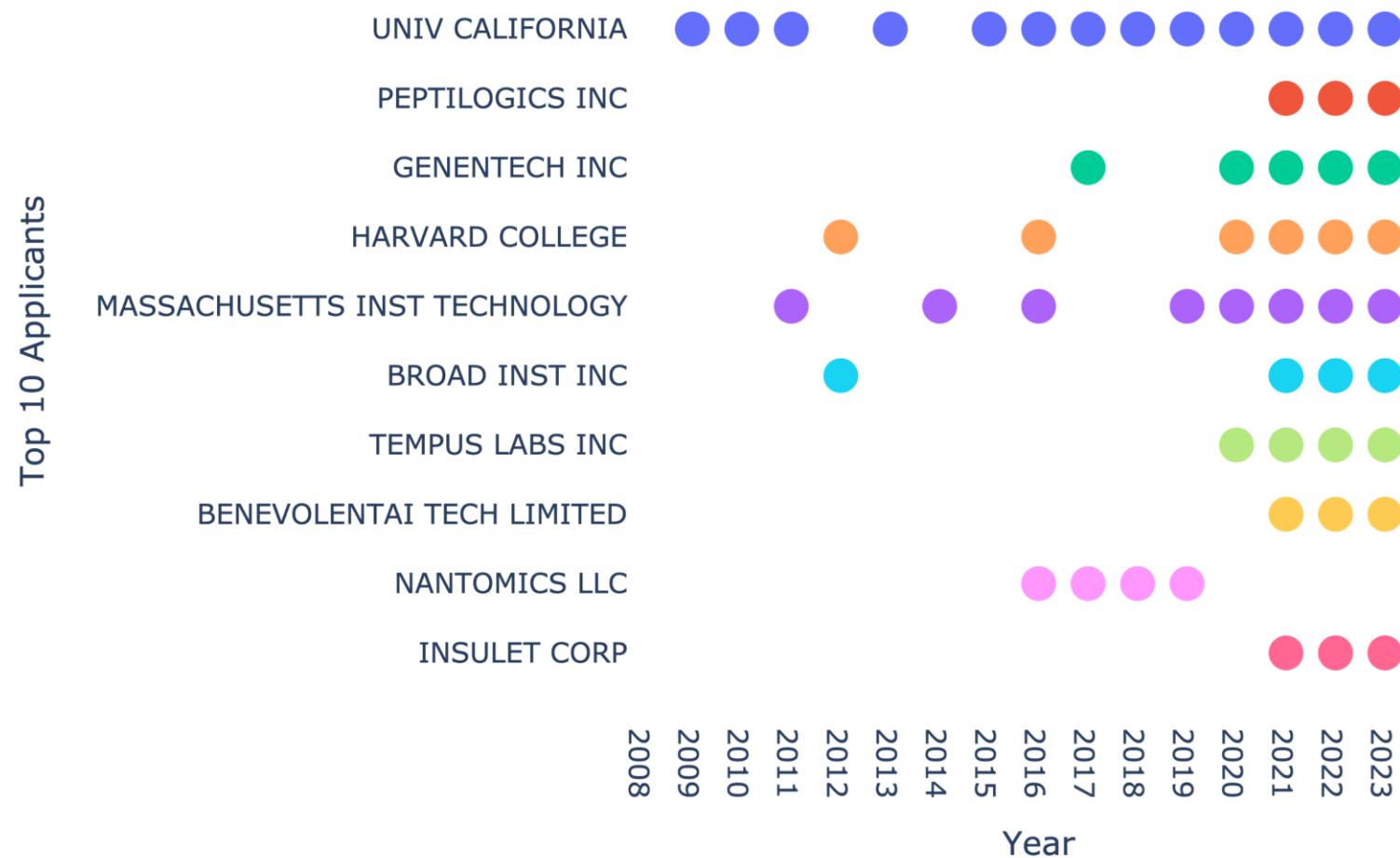


Market Analysis

[Executive summary](#)[Introduction](#)[Patent Landscape overview](#)[Technology Analysis](#)[Market Analysis](#)[Top Player's Portfolio](#)

Top applicant activity

The continuous technological efforts of leading companies filing patents demonstrate their enduring dedication and specialization in their specific domains. The visual representation below showcases the consistent patenting actions of the top ten firms in AI within the biotechnology sector.



Executive summary

Introduction

Patent Landscape overview

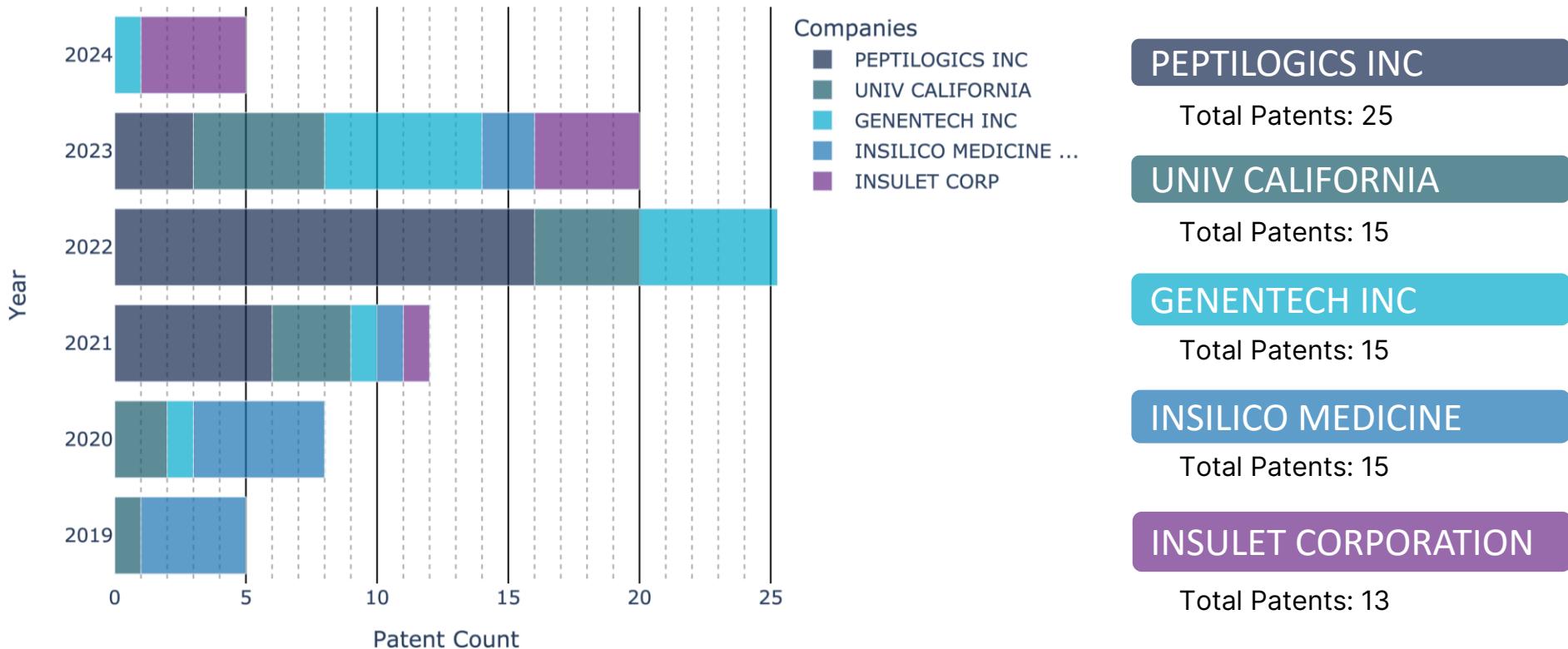
Technology Analysis

Market Analysis

Top Player's Portfolio

Pioneer companies in the last 5 years

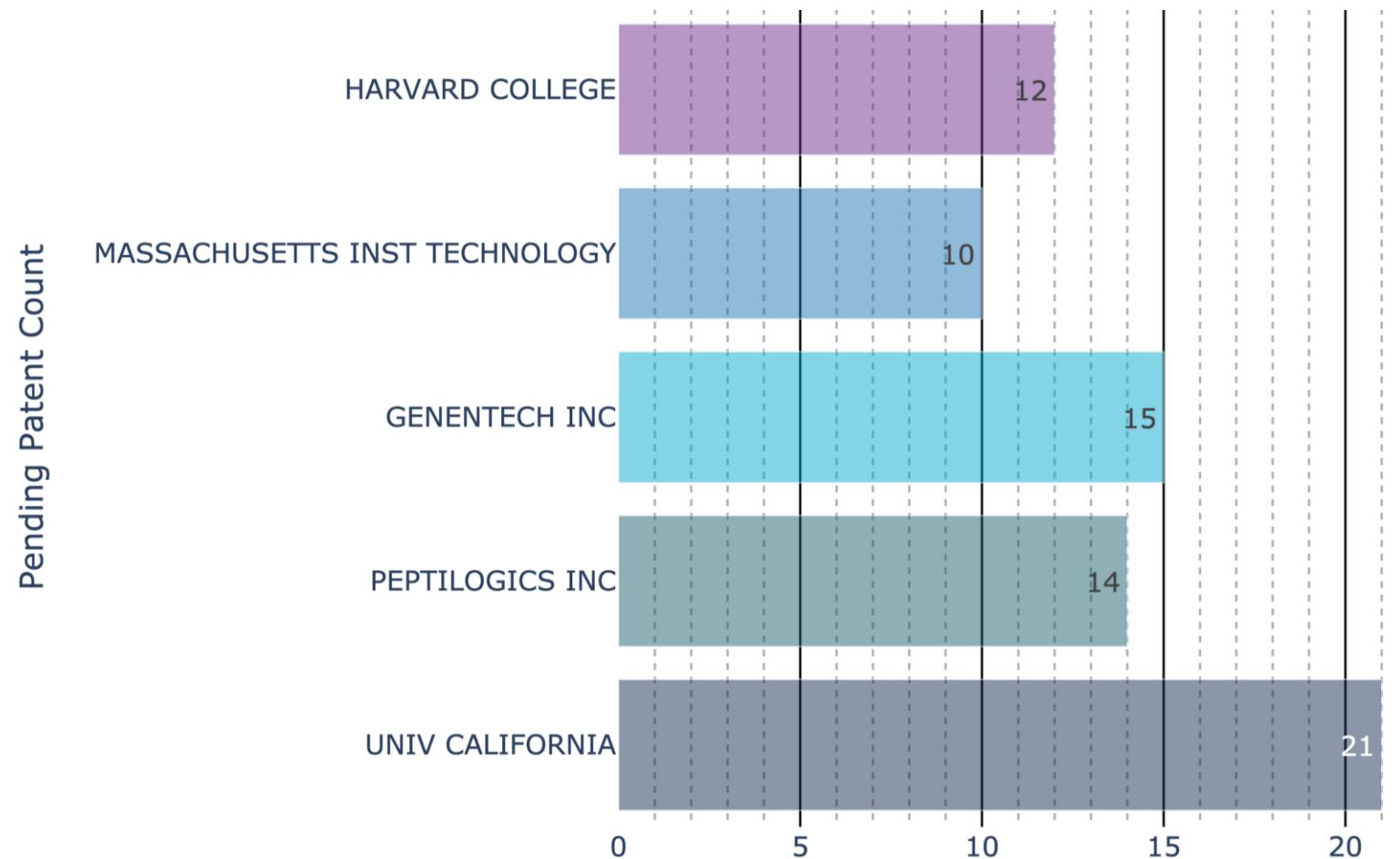
The amount of patent registration of companies in the last 5 years can indicate the possible business strategies of these companies in the coming years. As you can see in the figure below PEPTILOGICS INC is the leader in patent registration in this field. After this company, there are California University, GENENTECH INC and INSILICO MEDICINE.



[Executive summary](#)[Introduction](#)[Patent Landscape overview](#)[Technology Analysis](#)**Market Analysis**[Top Player's Portfolio](#)

Pending patents

Number of inventions per earliest publication year in the field of AI whithin Biotechnology, by limitation to International Patent Families.





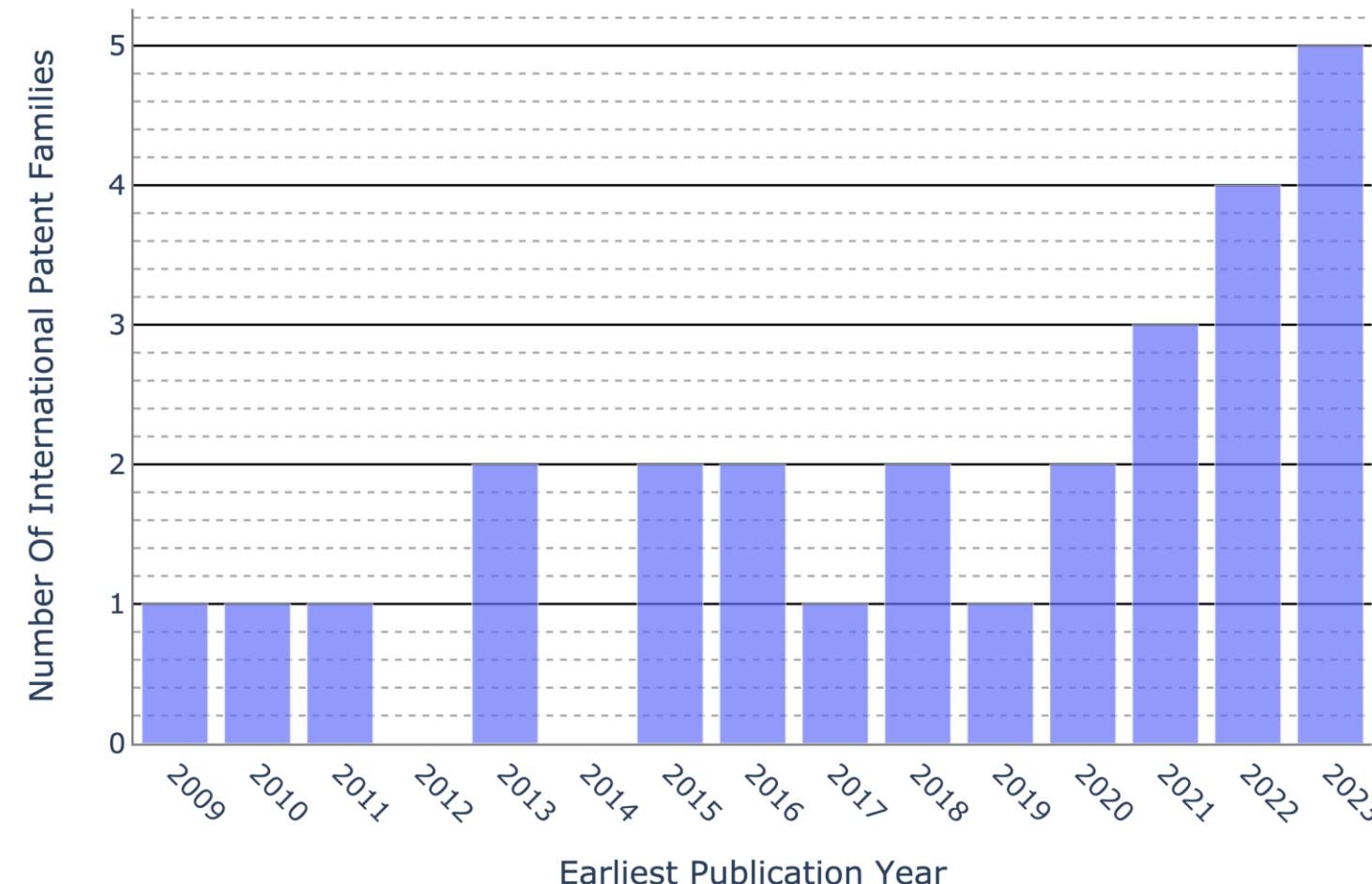
Top Player's Portfolio California University

[Executive summary](#)[Introduction](#)[Patent Landscape overview](#)[Technology Analysis](#)[Market Analysis](#)[Top Player's Portfolio](#)

California University

Patent family analysis

California University has increased its patent activity in the AI whithin Biotechnology sector, registering 27 patents from 2009 to 2023. The university's patent count experienced notable growth starting in 2021 and peaked in 2023.



Executive summary

Introduction

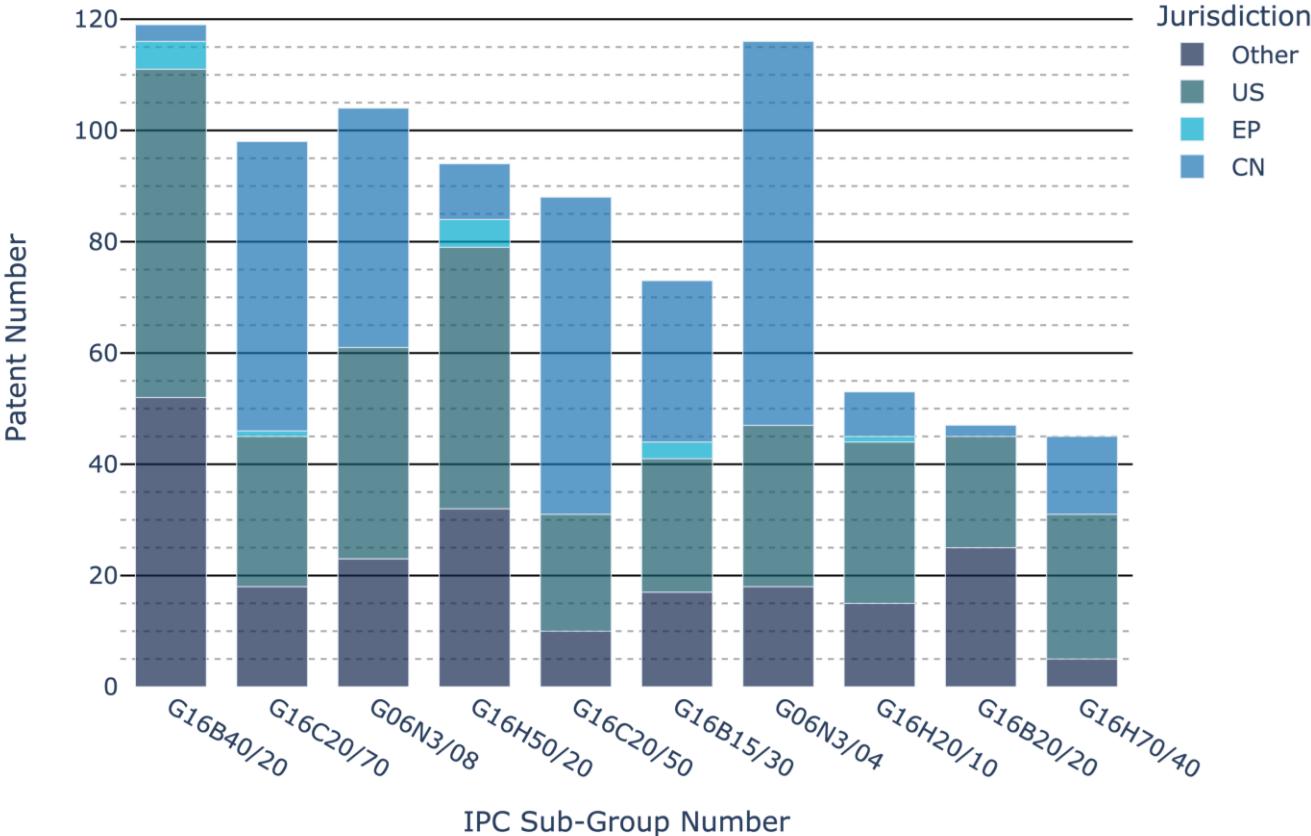
Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio

Top technologies by sub group



G16B40/20 Supervised data analysis

G16C20/70 Machine learning, data mining or chemometrics

G06N3/08 Learning methods

G16H50/20 for computer-aided diagnosis, e.g. based on medical expert systems

G16C20/50 Molecular design, e.g. of drugs

G16B15/30 Drug targeting using structural data; Docking or binding prediction

G06N3/04 Architecture, e.g. interconnection topology

G16H20/10 relating to drugs or medications, e.g. for ensuring correct administration to patients

G16B20/20 Allele or variant detection, e.g. single nucleotide polymorphism [SNP] detection

G16H70/40 relating to drugs, e.g. their side effects or intended usage

[ABOUT US](#)[PARTNER WITH US](#)[NEWS & EVENTS](#)[REQUEST FUNDING](#)[FACILITIES](#)[EDUCATION](#)[CONTACT](#)

INVITING
INDUSTRY
PARTNERS



**The University of California System Maintains the
Largest Pool of Academic Biomedical
Researchers in the Nation**



Improved **Cytosine to Guanine** Base Editors

Methods and Apparatuses **for Prediction of Mechanism of Activity of Compounds**

Methods for Treating **Cardiac** Valve Disease

Deep-Learning Based Methods For Virtual Screening Of Molecules For **Micro Ribonucleic Acid (Mirna) Drug Discovery**

Identifying the Presence of Metastatic Cancer and Tissue of Origin With Microbial Nucleic Acids

Detecting Somatic Single Nucleotide Variants From Cell-Free Nucleic Acid With Application to Minimal Residual Disease Monitoring

Methods and App

**Identify
Prediction
Monitoring
Drug discovery**

echanism o

iac Valve Di

Screening Of

(mRNA) Drug Discovery

**Nucleic Acids
Nucleotide Variants
Cytosine to Guanine**

Identifying the Presence of Metastatic Cancer and Tissue of Origin With Microbial Nucleic Acids

**Detecting Somatic Single Nucleotide Variants From Cell-Free Nucleic Acid With Application to
Minimal Residual Disease Monitoring**

Executive summary

Introduction

Patent Landscape overview

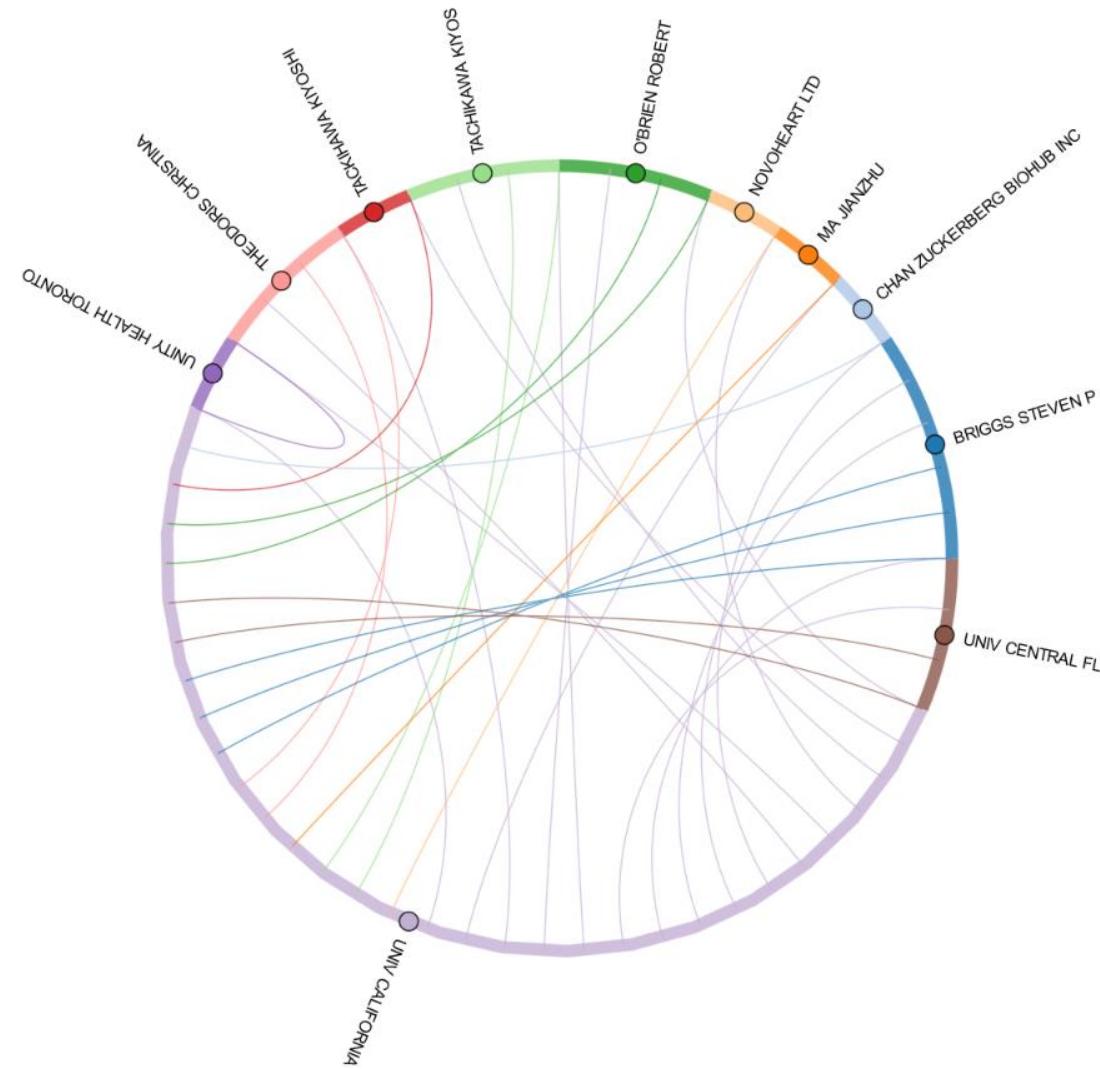
Technology Analysis

Market Analysis

Top Player's Portfolio

Collaborations

California University has primarily partnered with BRIGGS STEVEN P, along with collaborations with Central FLC University, THEODORIS CHRISTNA, TACHIKAWA KIYOSHI, and others.





Top Player's Portfolio

GENENTECH

Executive summary

Introduction

Patent Landscape overview

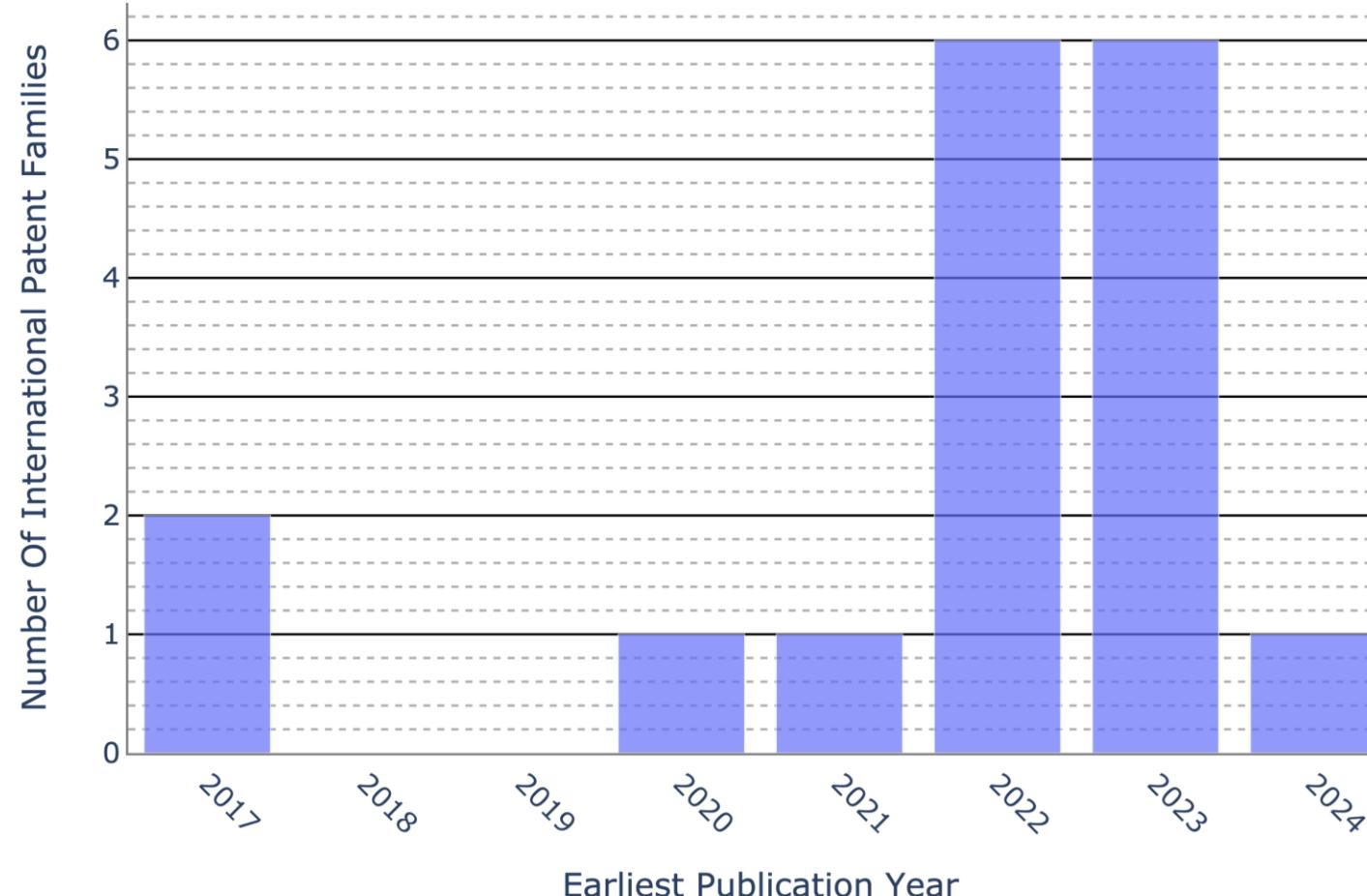
Technology Analysis

Market Analysis

Top Player's Portfolio

GENENTECH CO

Patent family analysis



Executive summary

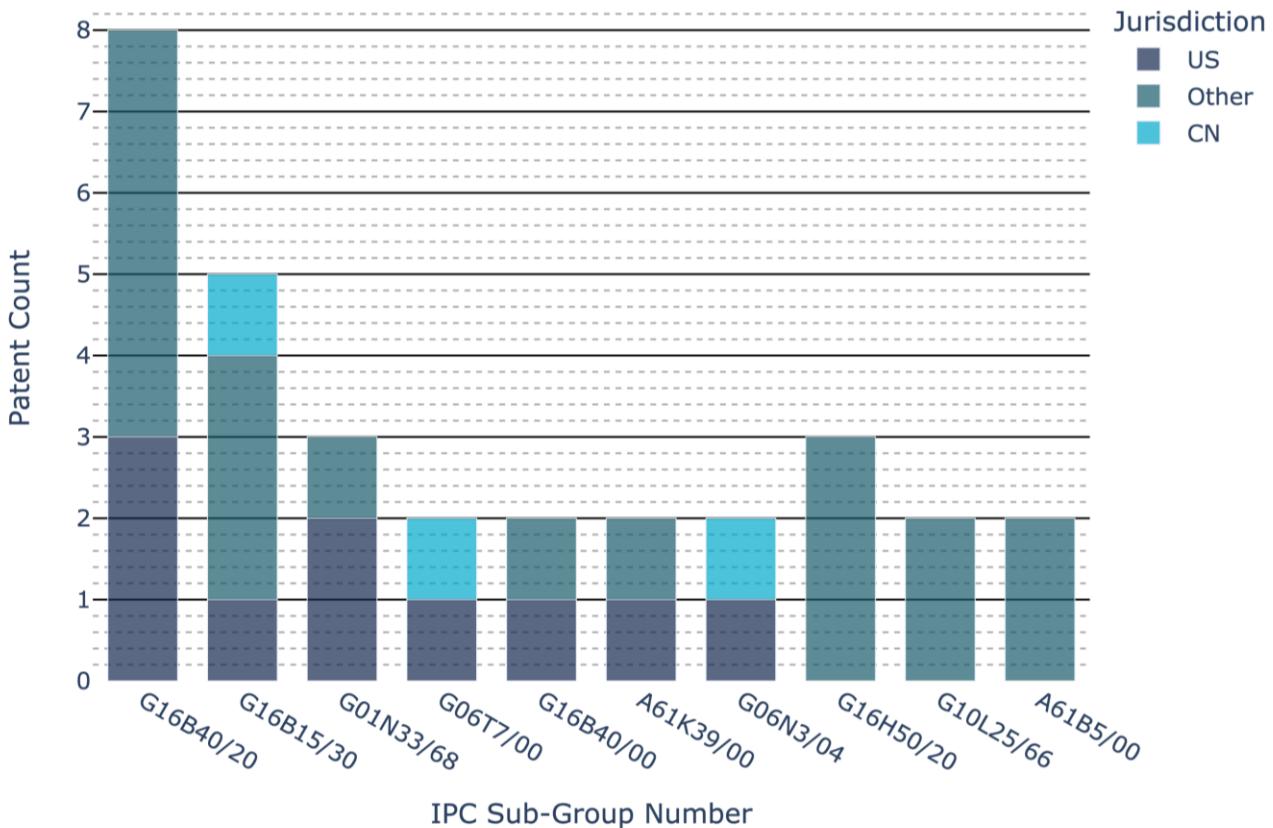
Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio



G16B40/20	Supervised data analysis
G16B15/30	Drug targeting using structural data; Docking or binding prediction
G16H50/20	for computer-aided diagnosis, e.g. based on medical expert systems
G01N33/68	Investigating or analysing materials (involving proteins, peptides or amino acids)

Executive summary

Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio

Genentech

A Member of the Roche Group

Function Guided In Silico **Protein Design**

Attention-Based Neural Network to
Predict Peptide Binding, Presentation,
and Immunogenicity

Assessment Of Skin Toxicity In An In Vitro Tissue Samples Using Deep Learning

Use of Tryptophan Derivatives for **Protein Formulations**

Hybrid **Protein Design**

Protein Design With Segment Preservation

Executive summary

Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio

Function Guided In Silico Protein Design

Assessment Of Skin Toxicity In An In Vitro Tissue Samples Using
Deep Learning

Use of Tryptophan Derivatives for Protein Formulations

Hybrid Protein Design

Attention-Based Neural Network to
Predict Peptide Binding, Presentation,
and Immunogenicity

Protein Design With Segment Preservation

Protein Design Protein formulation Peptide-peptid reaction

Executive summary

Introduction

Patent Landscape overview

Technology Analysis

Market Analysis

Top Player's Portfolio

Methodology

Data Collection

We selected the data of 1087 patents using a query that covers AI in Biotechnology patents. The patenting strategy of various players was analyzed.

Data Analysis

We applied some sophisticated machine learning algorithms such as LDA and BERT for topic modeling and KMeans for clustering. We also performed other descriptive analytics to increase the reliability of the results.

In addition, the report was reviewed by technical experts who work with us.

Executive summary

Introduction

Patent Landscape overview

Technology

Market Industry

Market Actors

Conclusions

Disclaimer

This document is provided for information purposes only and the contents hereof are subject to change without notice. This document, including the information and analysis and any opinion or recommendation, is neither legal advice nor intended for investment purposes. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. STIMAnalytics Inc. specifically disclaims any liability with respect to this document and no contractual obligations are formed either directly or indirectly by this document. STIMAnalytics owns all property and intellectual rights of this report and has the right to sell, distribute and publish in any manner



STIMAnalytics, InnoTech Co
Unit JLT-PH2-RET-5, Jumeirah
Lakes Towers,
Dubai, UAE
For contact details of STIMAnalytics
Visit www.stimanalytics.net