EXPLORING THE EVOLVING LANDSCAPE OF IMMUNO-ONCOLOGY

A data-driven analysis of emerging concepts and therapeutic targets

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Capital investment in immuno-oncology field

Source: Pitchbook Data, Inc.
Cancer immunotherapy clinical trials trend

Source: NIH ClinicalTrial.gov

Number of clinical trials

Year

Source: Cancer research institute, Pharmaprojects

Number of approved drugs

Year
How did we identify the connections?

Expert scientists combined with a wide range of ML tools to optimize connections.

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**CAS Content Collection™**

Deep dive into the Immuno-oncology space → Data Extraction → NLP and Human expertise integration → Journals, patents, emerging concepts

**DATA EXTRACTION**

- Title
- Abstract
- Year of Publication
- Type of Document
- Citations

**Natural Language Processing and Curation by SMEs**

- Pick up phrases that are 1-6 words in length
- Generate publication and citation rates, as well as relative growth
- ~8,000 results
- Manual processing by SMEs
- Grouping of similar concepts and hierarchical classification
The rapidly evolving field of cancer immunotherapy

Overall publication and citation trends

Source: CAS Content Collection
Journal publication trends by country/region

Source: CAS Content Collection

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Patent publication trends by country/region

Source: CAS Content Collection
Emerging concepts growth in journal publication
CAS Patent Trend Landscape

Cancer types

- Gallbladder Cancer (1.8K)
- Colon and Rectal Cancer
- Lung Cancer
- Prostate Cancer
- Endocrine System Cancer
- Ovary Cancer
- Stomach and Digestive System Cancer
- Uterine Cancer
- Head and Neck Cancer
- Bladder Cancer
- Liver Cancer
- Kidney Cancer
- Brain and Nervous System Cancer
- Esophageal Cancer
- Skin Cancer
- Testis Cancer
- Bone Cancer

Source: CAS Content Collection

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Target trends
Journal landscape

Cells

Proteins

Types of Targets

Pathways/Complex

Signaling lymphocytic activation molecule family member 7 (SLAMF7)

CD3

Glycoprotein

Cell surface

CD4

Glycophlan 3 (GPC3)

CEA-related Cell Adhesion Molecule 5 (CEACAM5)

Kinasas

Tyrosine Kinase

FMS-like Tyrosine Kinase (FLT3)

Bruton’s Tyrosine Kinase (BTK)

Anaplastic Lymphoma Kinase (ALK)

Tropomyosin Receptor Kinase (TRK)

Receptor tyrosine kinase-like orphan receptor 1 (ROR1)

Receptor tyrosine kinase-like orphan receptor 2 (ROR2)

Mitogen Activated Protein Kinase

Hematopoietic Progenitor Kinase

JAK1

AMPK-activated Protein Kinase

CDK1

Cyclin-dependent Kinase

CDK4/6

CD27

CD28

CD38

CD47

CD137 (4-1BB)

CD278 (ICOS)

Avg dPub/dt Relative Growth

0-5 0-1

0-10 1.1-1.5

11-15 1.6-2.0

16-20 2.1-3.0

21-40 3.1-4.0

41-100 4.1-5.0

101-200 5.1-7.0

201-500 7.1-9.0

>500 >9.1

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Target trends

Patent landscape
Target proteins

Fast growing while still in early phase

Therapeutic target protein
Inhibitory immune checkpoint molecules

Overall publications trends (Title/Abstract)

No. of publications 2020-2022

Relative growth rate per year

Therapeutic target protein

PD-1  PD-L1  IDO  CTLA-4  IDO1  BTLA  TDO  A2AR  LAG3  TIGIT  VISTA  B7-H3  IDO2
Stimulatory immune checkpoint molecules

Overall publications trends (Title/Abstract)

No. of publications 2020-2022

Relative growth rate per year

Therapeutic target protein

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CAS emerging therapy trends

Journal landscape

Types of Therapy

- Photothermal Therapy (PTT)
- Photodynamic Therapy (PDT)
- Sonodynamic Therapy (SDT)
- Chemodynamic Therapy (CDT)
- Demicmic Cell Activation
- STING agonist
- Autophagy Inhibitor
- CD2 Inducer
- PARP inhibitor
- B-cell Lymphoma 2 (BCL2) Inhibitor

Avg dPub/dt Relative Growth
- 0-5 0-1
- 6-10 1.1-1.5
- 11-15 1.6-2.0
- 16-20 2.1-3.0
- 21-40 3.1-4.0
- 41-100 4.1-5.0
- 101-200 5.1-7.0
- 201-500 7.1-9.0
- >500 >9.1

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CAS emerging therapy trends
Patent landscape
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– Qiongqiong Angela Zhou
Gain insights on emerging therapies and more

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