

# AI Review Paper Writer for Cancer

biologyAI

# Review article for Cancer treatment

Review articles in scientific journals are helpful

There are many kinds of cancer

Also many kinds of treatment

AI to help write a review article for one treatment :  
ImmTAC (Immune Mobilizing Monoclonal TCRs  
Against Cancer)

Intelligence Amplification for Bioinformaticians

Bioinformatics : new science that uses algorithms to  
study biology

We want to give bioinformaticians new superpowers  
with LLMs



cancers



Review

## Tebentafusp: T Cell Redirection for the Treatment of Metastatic Uveal Melanoma

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**Abstract:** Metastatic disease from uveal melanoma occurs in almost 50% of patients suffering from this ocular tumour, with median survival from development of symptoms being around 1 year. In contrast to cutaneous melanoma, kinase inhibitors and immune checkpoint inhibitors are usually ineffective in patients with metastatic uveal melanoma. Tebentafusp is a novel form of immunotherapy based on the immune-mobilising monoclonal T cell receptor against cancer (ImmTAC) platform, which comprises a soluble T cell receptor that is fused to an anti-CD3 single-chain variable fragment. The T cell receptor domain of tebentafusp targets cells present a human leukocyte antigen-A\*02:01 complexed with a peptide derived from the melanoma-associated antigen gp100, which is expressed strongly by melanoma cells, weakly by normal melanocytes and minimally by other tissues. The anti-CD3 domain recruits CD3+ T cells (and, indirectly, other immune cells), redirecting these to the melanoma cells. The most common adverse events with tebentafusp are manageable and usually transient. Early survival data in patients with metastatic uveal melanoma are promising when considered alongside historical data. Based on these encouraging results, a randomised study comparing tebentafusp to investigator's choice of therapy in metastatic uveal melanoma is ongoing.

**Keywords:** metastatic uveal melanoma; immunotherapy; tebentafusp; T cell; clinical data; preclinical data; ImmTAC platform; T cell receptor; anti-CD3 bispecific

# ImmTAC

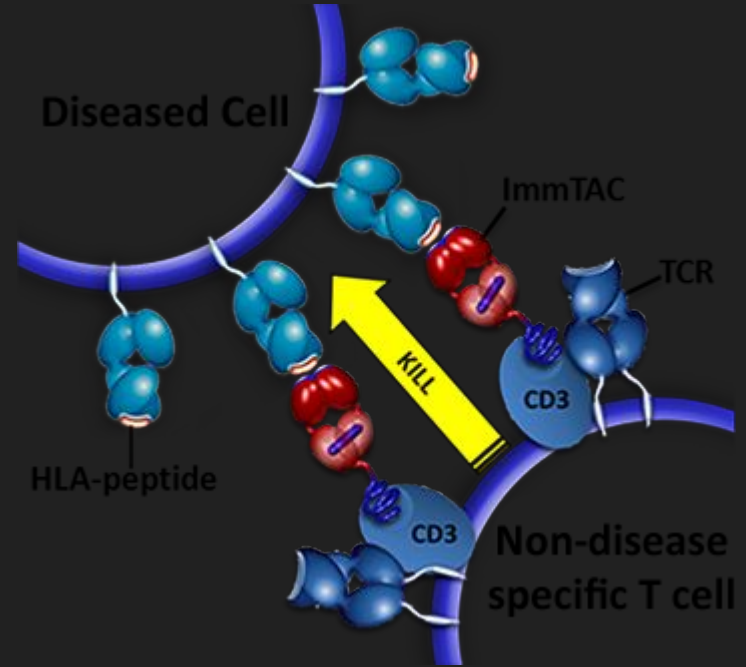
ImmTAC : Immune Mobilizing Monoclonal T-Cell Receptors (TCRs) Against Cancer

Novel class of bi-specific biological drugs designed to direct the immune system to recognize and kill cancer cells.

Consist of a soluble T-cell receptor (TCR) linked to an anti-CD3 immune-effector function.

One approved by FDA last year (Tebentafusp)

Others in development



# AI to write ImmTAC review article for every cancer

Focus on one kind of treatment ImmTAC

It's a revolutionary new treatment that uses your own immune system

Potentially applicable to all kinds of cancers

FDA approval for one treatment already (Tebentafusp)

Two others in development

Many other similar treatments that could cross-pollinate

# Entrez Pubmed

Central biomedical literature database.

Millions of diverse scientific articles.

- AI Relevance:
  - Rich text data source for machine learning.
  - Broad topic range for diverse training.
- AI Applications:
  - Enhances NLP and predictive modeling.
  - Supports synthetic data generation in AI.

# Flowchart

- 1) Analyze a good review article to make a template
  - a) Use LLM to analyze the purpose of each sentence
  - b) Use LLM to write a prompt to make a new sentence
- 2) Make list of all cancers
- 3) For each cancer
  - a) Download all abstracts from pubmed about this cancer
  - b) For each sentence in the template, generate one for this cancer

## Demo : LLM to determine intent

What is the purpose of the following sentence in a review paper? "Approximately 90% of UMs involve the choroid; the remainder being confined to the iris or the ciliary body."

[AI]: The sentence is providing statistical information about the occurrence of Uveal Melanomas (UMs), stating that the majority of them involve the choroid with a smaller percentage affecting the iris or ciliary body. It clarifies the common locations of this condition.

## Demo : LLM builds prompt

[ME]: How could I turn this into a prompt for an LLM to reproduce the first sentence but for pancreatic cancer?

[AI]: Provide a sentence summarizing the distribution of pancreatic cancer manifestations in different parts of the pancreas, similar to how the original sentence detailed the occurrence of Uveal Melanomas (UMs) in different parts of the eye.



## Demo : PubMed Entrez

Entrez search using Edirect

```
esearch -db pubmed -query "PRAME" | efetch  
-format abstract > out.txt
```

# Demo : LLM with RAG

[ME]: Provide a sentence summarizing the distribution of pancreatic cancer manifestations in different parts of the pancreas, similar to how the original sentence detailed the occurrence of Uveal Melanomas (UMs) in different parts of the eye. Using the following research [[ABSTRACT]]

[AI]: Approximately 70% of pancreatic cancers occur in the head of the pancreas, with the rest spreading to the body and tail of the organ.[ref]

# Market Analysis: AI in Oncology

## TAM: Global Oncology Drugs Market

- 2022 Value: USD 184.95 Billion
- Projected 2030 Value: USD 484.32 Billion
- Includes all cancer R&D activities globally.

## SAM: AI in Oncology

- 2023 Value: USD 1.20 Billion
- Expected Growth: 33.5% CAGR (2024-2030)
- Focused on AI for cancer research, diagnostics, and treatment.

# Potential Revenue Streams in AI for Oncology

AI platforms for drug discovery and development.

Data Management & Analytics

Cancer data storage and analysis services.

Patient data management systems.

Partnerships with pharma and biotech companies.

Licensing AI algorithms and technologies to research institutions

# Key Competitors in AI for Oncology

BenchSci : Specializes in AI-driven literature analysis for antibody discovery and research.

IBM Watson Health : Offers AI solutions for data-driven clinical decision support.

Flatiron Health : Provides cancer-focused electronic health records and data analysis.

Tempus : Delivers precision medicine solutions through AI-powered data analytics.

DeepMind Technologies (Google Health) : Involved in various healthcare AI projects, including cancer-related research.

# Future applications of LLMs in cancer research

**Comprehensive Literature Review:** Utilize LLM to analyze and summarize existing research papers, extracting key information on cancer antigens.

**Identifying Connections:** LLM models can detect hidden correlations between different studies, revealing potential antigen targets.

**Update Alerts:** Set up LLM to provide updates on new research findings in specific cancer types and antigen discovery.

**Data Synthesis:** LLM integrates diverse data sets (genomic, clinical trials, etc.) for comprehensive antigen profiles.

**Hypothesis Generation:** LLM suggests new hypotheses based on existing literature for exploring undiscovered antigens.