BioAI : Cure all cancers

BioX

syn bio + AI + robots + chip labs => win

Convergence of technologies will revolutionize biology

Immense potential for helping human health

Technologies are:

- AI

- synthetic biology

- robotics

- miniaturization of experiments

Mining knowledge from a vast archive of science papers

~100 million scientific papers

~30 million papers in biology

Use Artificial Intelligence to extract knowledge

Retrieval Augmented Generation

Synthesize knowledge from this archive

Application areas in biology

Many different problems in biology amenable to this approach

Life Extension

Vaccine Development

Treatment of Rare Diseases

Development of novel antibiotics

Cancer

One new platform for cancer treatment

Many different modalities of cancer treatment

Some are : CAR-T Cells, TCR-T Cells, Antibody-Drug Conjugates (ADC), Checkpoint Inhibitors, Oncolytic Viruses, Tumor-Infiltrating Lymphocytes (TILs), Cancer Vaccines

BiTEs (Bispecific T-cell Engagers) are engineered antibodies that bind both T cells and cancer cells, bringing them into close proximity to trigger a potent immune response. By engaging the T-cell receptor CD3 on one side and a specific tumor antigen on the other, BiTEs help activate the immune system to kill the cancer cells.

Tebentafusp is a BiTE specifically designed to target gp100, an antigen expressed in melanoma. It has shown promise in treating uveal melanoma, offering a new therapeutic option for this rare and difficult-to-treat cancer type.

BiTES

Bispecific T-cell Engagers (BiTEs): Engineered antibodies that bind both T cells and cancer cells.

Mechanism: Brings T cells into proximity with cancer cells by binding CD3 (on T cells) and a tumor-specific antigen.

Immune Activation: Triggers T cells to attack and kill cancer cells without needing additional immune signals.

Advantages: Directs the body's own immune response with high specificity and reduces off-target effects.

Notable Example: Tebentafusp targets gp100 in uveal melanoma, showing significant promise in treating this rare cancer.

Applications: Effective in various cancers, including hematologic malignancies and some solid tumors.

Our proposal

Use AI to search for papers about a specific cancer

For each paper, use AI to find all the antigens overexpressed in this cancer

Use AI to create experiments for Ginkgo Bioworks to run to develop novel antibodies for this antigen using Phage Display.

Use molecular modelling to fuse the T-cell protein fragment with the new developed antibody.

Use AI to write patents for each of the sequences

Use AI to write a business plan and analysis

Our algorithm

1) Search pubmed central for full text papers about a chosen cancer

2) Process these papers using artificial intelligence and identify all

potential antigens in these papers

3) Use artificial intelligence to develop a robotic laboratory procedure using the ginkgo bioworks platform to generate antibodies using phage display that can bind to these antigens on MHC molecules

4) Use AI to write patents

5) Use AI to write business plan

Demo