CAR T Immune Therapy: Arming T Cells to Bind to and Destroy Brain Cancer

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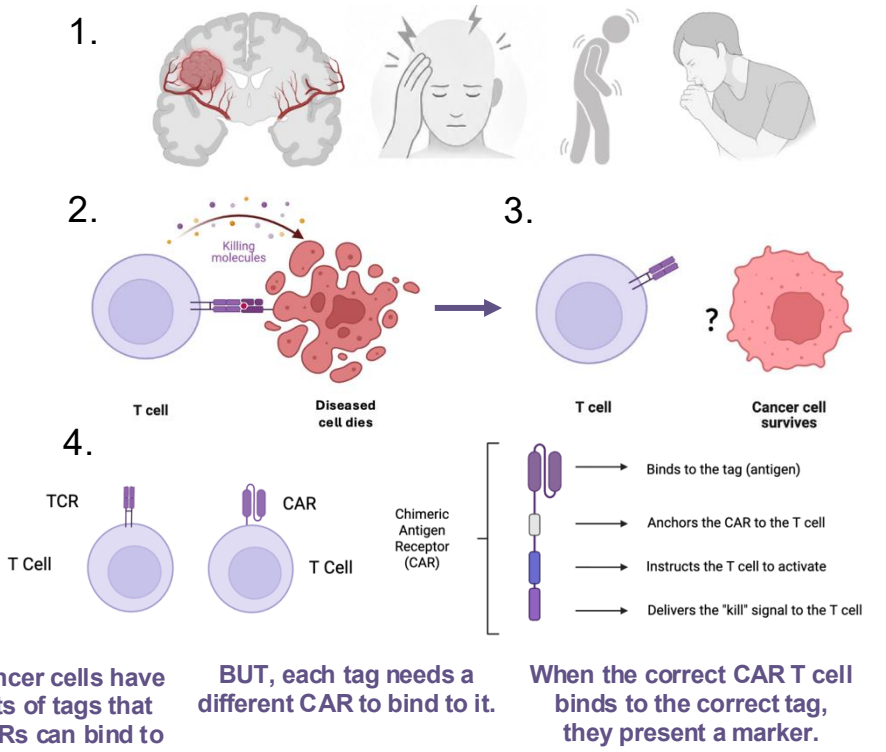
Background & Introduction

1. Treatment for brain cancer must only target the cancer cells, or it can harm normal brain function (walking, talking, breathing, etc).

2. T cells fight disease but are thwarted when cancer cells turn off markers identifying them as diseased, so the cells appear normal.

3. The cancer cell effectively hides the "lock" that the T cells recognise and can bind to.

4. CAR T cells are T cells modified to display a different receptor, that can bind to different markers which the cancer cells display and then send an instruction to begin killing of the cancer cell.



Aim & Hypothesis

Aim: find out which CARs can recognize and bind to specific tags (antigens) on brain cancer cells.

Hypothesis: CARs which bind will activate and present a marker which we can use to identify them.

Methods & Results

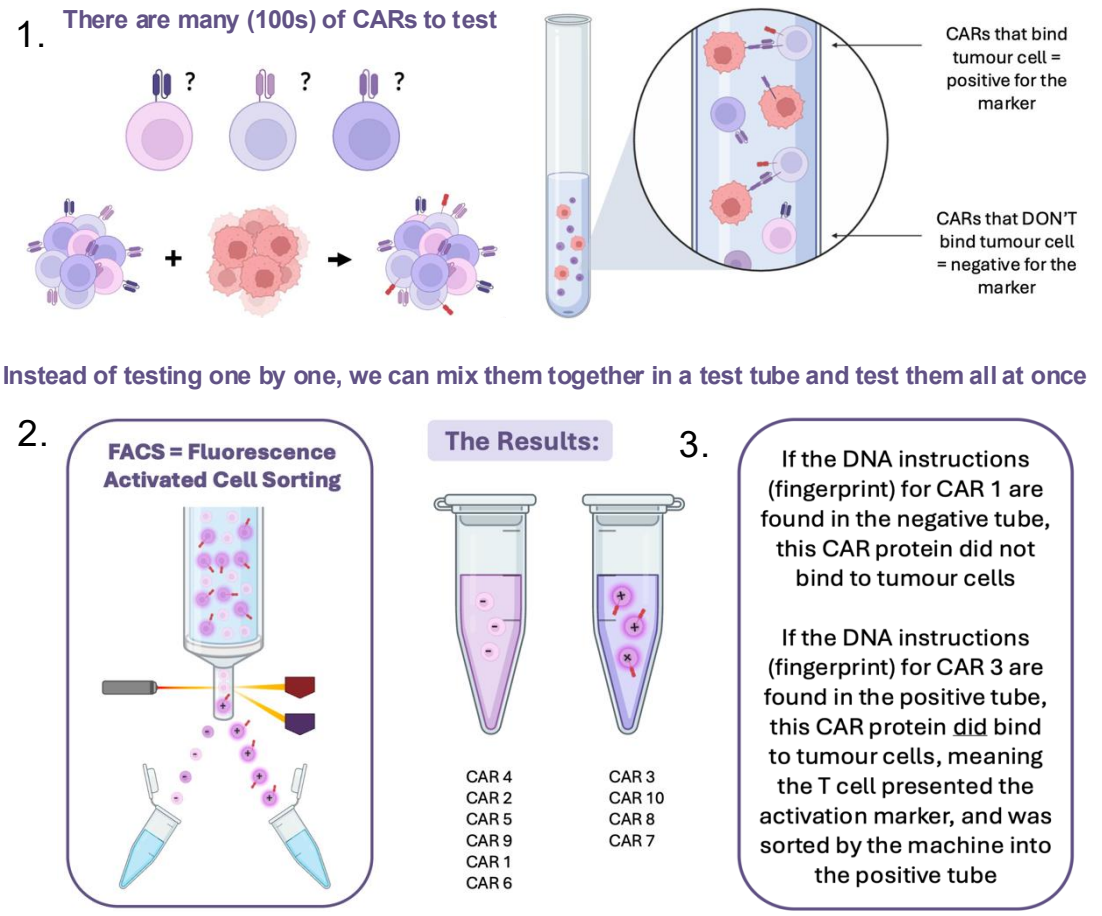
1. We have LOTS of different CARs we want to test, to find out which ones bind to brain tumour cells. Rather than testing them individually, we can mix them.

2. We sort them using a FACS machine. Negative = no marker.

Positive = a marker is present.

Only CARs in the mix that bind to cancer cells and activate will have the marker!

3. Each CAR is a unique protein which requires specific DNA to create it, and by examining which CARs DNA is in the positive tube, we can use those CARs in patients to kill brain cancer cells.



Key Takeaways & Future Steps

Once we identify which CAR T cells do bind to cancer cells, we must then ask: Do they ONLY bind to cancer cells? What about healthy cells? Can it send the instruction to kill, or does it only bind? CAR T could bring hope to patients with brain cancer who presently face a limited life span and treatments that affect their brain's ability to function. CAR T cell therapy may change all that.