



# THINKING ABILITIES IN THE FIRST 2 MONTHS AFTER BRAIN TOXICITY FROM CHIMERIC ANTIGEN RECEPTOR T-CELL THERAPY

## PLAIN LANGUAGE SUMMARY

Source: Kazzi, C., Griffith, S. P., Ko, K. Y., Pearce, D. J., Wronski, M., Seery, N., ... & Monif, M. (2025). Repeatable Battery for the Assessment of Neuropsychological Status (RBANS): preliminary utility for subacute cognitive monitoring after immune effector cell-associated neurotoxicity syndrome after chimeric antigen receptor T-cell therapy. Transplantation and Cellular Therapy. <https://www.sciencedirect.com/science/article/pii/S2666636725016070>

### 1 WHY DID WE DO THIS WORK? WHY IS IT IMPORTANT?

- Chimeric antigen receptor T-cell (CAR-T) therapy is a newly approved treatment for many blood cancers. It is also being tested for other conditions.
- It is a therapy where a person's own immune cells are processed in the lab so they can recognise and attack cancer cells. The engineered cells are injected back into the person.
- Chimeric antigen receptor T-cell therapy can be effective as a cancer treatment, but in some cases, it also has side effects.
- One of these side effects is toxicity in the brain. This brain toxicity is called immune effector cell-associated neurotoxicity syndrome (ICANS).
- People can become confused and have difficulties with thinking, concentration, speaking, writing and remembering recent events.
- It is not clear what the recovery of thinking abilities is like after brain toxicity.
- It is also not clear what tests we should use to track these thinking changes.

### 2 WHAT DID WE DO?







- We used a test called the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) to track recovery after brain toxicity. This test measures attention, language, visual skills, and memory.
- All patients who received CAR-T therapy at the Alfred between June 2023 and June 2025 were tested with the RBANS. They were tested three times: one day after treatment, one week after treatment, and 1.5 months after treatment.

### 3 WHAT DID WE FIND?

- 87 patients were included in our study.
- 30 of 87 (34%) of patients developed brain toxicity.
- We compared the RBANS test scores between patients who did and did not develop brain toxicity. The test scores are attention, language, visual skills, immediate memory, delayed memory, and a total test score.
- One week after treatment, patients who developed brain toxicity had worse attention, language, and overall test scores compared to patients who did not develop brain toxicity.
- 1.5 months after treatment, patients who developed brain toxicity had worse overall test scores compared to patients who did not develop brain toxicity. All other test scores were similar between the patient who did and did not develop brain toxicity.
- Patients with severe brain toxicity performed worse than patients with mild brain toxicity.

### 4 WHAT DO THESE FINDINGS MEAN?

- Patients who developed brain toxicity have difficulties paying attention, thinking quickly, and finding words when speaking. Most of these difficulties resolve after 1.5 months. For some patients, especially those who develop severe brain toxicity, recovery can take longer.
- The RBANS is a helpful test to track thinking skills for patients who are treated with CAR-T therapy.

<b>MEMORY</b>  Remember a list of words  Remember a story		<b>VISUOSPATIAL FUNCTION</b>  Copy a figure  Matching lines													
<b>LANGUAGE</b>  Naming objects  Thinking of words in a category		<b>ATTENTION</b> 7-2-9-4 Repeating numbers <table border="1" data-bbox="678 2004 821 2184"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>★</td><td>1</td><td></td></tr> <tr><td>○</td><td>2</td><td></td></tr> <tr><td>△</td><td>3</td><td></td></tr> </table> Symbol and number matching		1	2	3	★	1		○	2		△	3	
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