Weill Cornell Medicine

Anti-CEMIP Antibodies for Prevention and Treatment of Metastasis to the Brain

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Background & Unmet Need

- Brain metastasis is the most common brain tumor, making up more than 50% of brain tumors in adults[1]
- Patients with brain metastasis have poor prognosis, with a 5-year overall survival rate of only 2.4%[2]
- Current treatment options include surgery, which is limited by tumor location, or radiation-based therapy, which is associated with cognitive decline
- Despite these therapies, brain metastasis has a high rate of recurrence
- Tumor-derived exosomes may play a role in shaping the pre-metastatic niche driving brain metastasis
- Gaining insight into the mechanisms of brain metastasis and the contribution of tumor-derived exosomes to this process provides opportunities to identify therapeutic targets
- **Unmet Need:** Methods for treatment and prevention for metastasis to the brain

Technology Overview

- **The Technology:** A therapeutic antibody targeting Cell migration-inducing and hyaluronan-binding protein (CEMIP) for prevention and treatment of cancer metastasis to the brain
- **The Discovery:** CEMIP remodels the brain microenvironment by inducing inflammation in the vascular niche, which promotes brain metastasis
- Depletion of CEMIP in tumors impairs brain metastasis, disrupting invasion and tumor cell association with the brain vasculature
- **PoC Data:** Mice were injected intracardially with brain-trophic metastatic breast cancer cells (BrT1) with or without (KO) CEMIP expression
- Mice with BrT1 CEMIP KO cells had 70% fewer metastatic foci and reduced metastatic burden in the brain 4 weeks post-injection compared to those with full CEMIP expression

*Antibodies to CEMIP have been generated in collaboration with the **Tri-I TDI** and tested for blocking capacity in vitro*

Inventors:
David Lyden
Goncalo Rodrigues
Abdul Khan
Irena Rajnpreht

Developed in collaboration with the Tri-I TDI

Patents:
US Application Filed
EP Application Filed

Publications:
Rodrigues et al. *Nature Cell Biology*. 2019.

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[1]Loeffler. *UpToDate*. Updated 2022.
[2]Lauko et al. *Neurooncol Adv*. 2020.

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Technology Applications

- Prophylactic therapy for patients with high likelihood of metastasis to the brain
- Therapeutic treatment for patients with existing brain metastasis

Technology Advantages

- CEMIP can be targeted at early stage, during pre-metastatic niche formation, allowing for prevention of brain metastasis
- High levels of CEMIP are associated with progression of brain metastasis and can serve as biomarker for anti-CEMIP therapy

Supporting Data / Figures

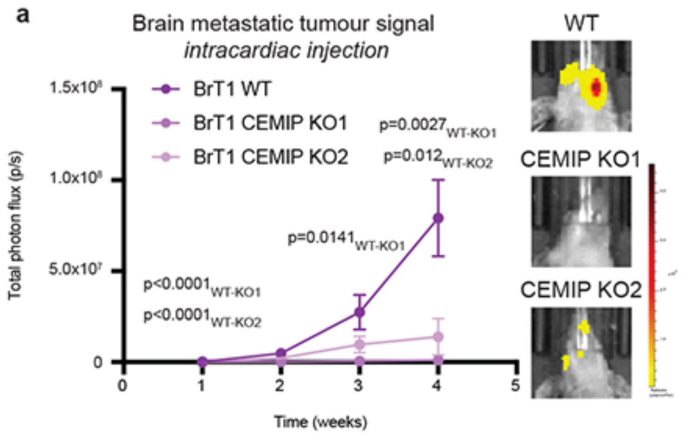

Figure 1: Mice intracardially injected with brain-trophic breast cancer metastatic cells (BrT1) with CEMIP knocked out had decreased brain metastatic tumor signal.

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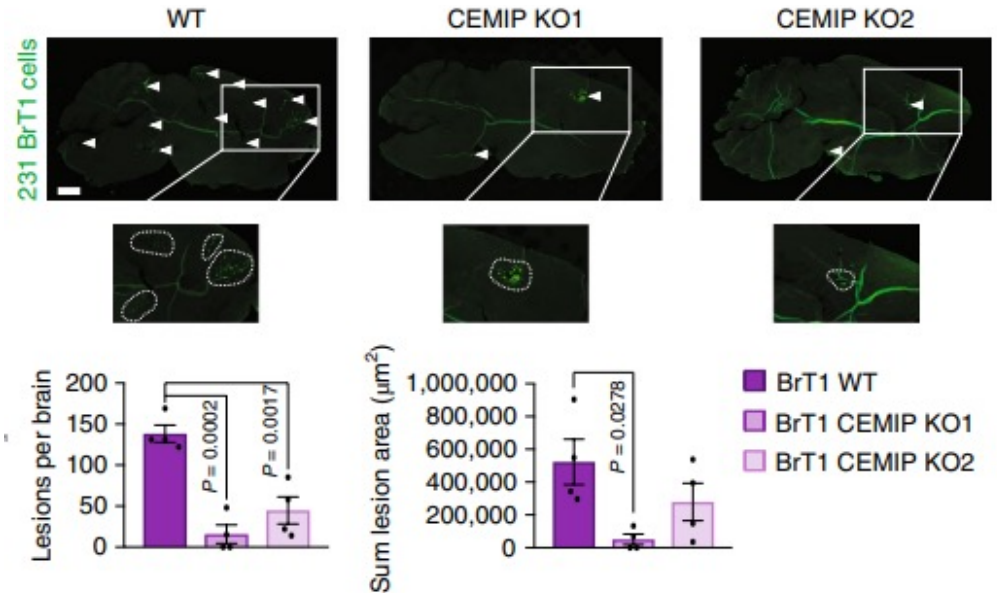

Figure 2: The number and overall area of brain metastatic legions (green, white arrows) was significantly decreased in mice injected with brain-trophic metastatic breast cancer cells (BrT1) with genetic KO of CEMIP 4 weeks post injection compared to those with full CEMIP expression.

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