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

Lead Inventor:

David Lyden, M.D., Ph.D.
Professor of Pediatrics, Weill Cornell Medical College
Director of the Physician Scientist Training Program, Weill Cornell Medical College
Stavros S. Niarchos Professor in Pediatric Cardiology, Pediatrics, Weill Cornell Medical College
Professor of Cell and Developmental Biology, Cell and Developmental Biology, Weill Cornell Medical College

Business Development Contact:
Brian Kelly
Director, Technology Licensing
(646) 962-7041
bjk44@cornell.edu
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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

<table>
<thead>
<tr>
<th>Technology Overview</th>
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<tr>
<td><strong>The Technology:</strong> A therapeutic antibody targeting Cell migration-inducing and hyaluronan-binding protein (CEMIP) for prevention and treatment of cancer metastasis to the brain</td>
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<td><strong>The Discovery:</strong> CEMIP remodels the brain microenvironment by inducing inflammation in the vascular niche, which promotes brain metastasis</td>
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<td>Depletion of CEMIP in tumors impairs brain metastasis, disrupting invasion and tumor cell association with the brain vasculature</td>
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<td><strong>PoC Data:</strong> Mice were injected intracardially with brain-trophic metastatic breast cancer cells (BrT1) with or without (KO) CEMIP expression</td>
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<td>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</td>
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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:**

**Biz Dev Contact:**
- Brian Kelly
- (646) 962-7041
- bjk44@cornell.edu

**Cornell Reference:**
- D-7932

\(^1\) Loeffler. *UpToDate*. Updated 2022.
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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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Goncalo Rodrigues
Abdul Khan
Irena Rajnpreht

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**Supporting Data / Figures**

**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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