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**

<table>
<thead>
<tr>
<th>The Technology</th>
<th>The Discovery</th>
<th>Depletion of CEMIP in tumors impairs brain metastasis, disrupting invasion and tumor cell association with the brain vasculature</th>
</tr>
</thead>
<tbody>
<tr>
<td>The antibody targets Cell migration-inducing and hyaluronan-binding protein (CEMIP) for prevention and treatment of cancer metastasis to the brain</td>
<td>CEMIP remodels the brain microenvironment by inducing inflammation in the vascular niche, which promotes brain metastasis</td>
<td>PoC Data: Mice were injected intracardially with brain-trophic metastatic breast cancer cells (BrT1) with or without (KO) CEMIP expression</td>
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<td>Antibodies to CEMIP have been generated in collaboration with the Tri-I TDI and tested for blocking capacity in vitro</td>
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**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:**

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**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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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.