

36: Antibody to inhibit metastasis of HER2-positive breast cancer

- ✓ **Monoclonal antibody to block Plexin-B1 binding**
- ✓ **Strong decrease of metastasis formation**

The Technology

Our new monoclonal anti-Plexin-B1 antibody blocks Plexin-B1 and thereby the activation of ErbB-2 mediated breast cancer and the metastasis of breast cancer cells. Lowering the levels of Plexin-B1 should allow a disease-free survival of 70% of the patients (Fig.2). Thus the new antibody could avoid the Herceptin resistance which reduces disease recurrences by 50% and mortality by approximately one third.

Background

Breast cancer is the most common primary malignancy in women. About 30% of all breast cancers overexpress the receptor tyrosine kinase Epidermal growth factor Receptor 2 (ErbB-2). Other names are CD340, HER2 or p185. Such tumors are characterized by aggressive behavior and poor prognosis. A plethora of evidence including transgenic mice which overexpress ErbB-2 in their mammary glands and subsequently develop breast cancer directly implicates ErbB-2 signalling in mammary oncogenesis.

Advantages

- ✓ target specific therapy
- ✓ slow or stop metastasis
- ✓ block growth signals

Commercial Opportunity

- ✓ Personalized medicine
- ✓ Breast cancer therapy

Intellectual Property

Patent application PCT/EP 2012/052238

Reference:

1. Slamon 1989, Science 244:707-712
2. Swiercz, et al. J. Biol. Chem., Vol. 283, Issue 4, 1893-1901, January 25, 2008

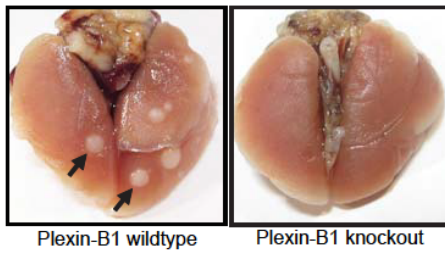
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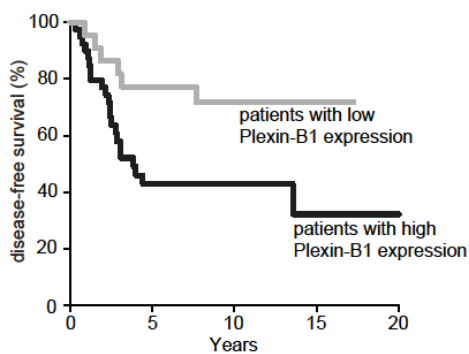
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Figure 1: Plexin-B1 promotes breast cancer metastasis in a mouse model of ErbB-2-overexpressing breast cancer.



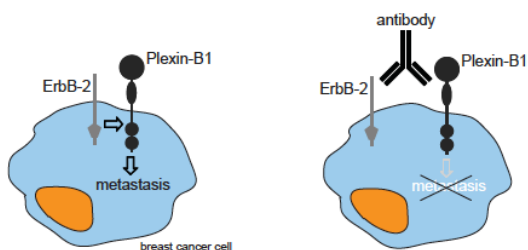
Ablation of the Plexin-B1 gene inhibits lung metastasis (arrows) in mice with ErbB-2-overexpressing breast cancer.

Figure 2: Patients with low expression levels of Plexin-B1 have a higher chance of survival.



In patients whose tumors express high levels of Plexin-B1, survival without cancer recurrence or metastasis is only 30% within the first 15 years after diagnosis. In patients with low levels of Plexin-B1, disease-free survival is 70%.

Figure 3: Therapeutic strategy to inhibit metastasis of HER2-positive breast cancer.



In breast cancer cells, HER2 (ErbB-2) activates the receptor Plexin-B1. This activation of Plexin-B1 promotes invasive behavior and metastasis of the breast cancer cell. A monoclonal anti-Plexin-B1 antibody blocks activation of Plexin-B1 and cancer cell metastasis.