

# LICENSING OPPORTUNITY

ETH transfer – Linking Science and Business

## Cancer prognostics based on non-invasive imaging of lymphangiogenesis

### Patent Status

- Patent pending PCT

### Keywords

Lymphangiogenesis, Non-invasive imaging, Cancer, Inflammation, Cancer metastasis, Lymph node, Positron Emission Tomography, Fluorescence Mediated Tomography

### Summary

The presented opportunity is a novel technology for non-invasive imaging of lymphatic vessels. It can be applied to detect and monitor lymphangiogenesis e.g. in lymph nodes, using Immuno-Positron Emission Tomography (PET) and other imaging methods.

### Background

Cancer metastasis to regional lymph nodes is an important prognostic indicator for many cancer types. Current non-invasive imaging technologies are not sensitive enough for the reliable detection of lymph node metastases below one centimeter in size. Therefore regional lymph nodes of cancer patients are excised and analyzed by a more established method. However, during this procedure healthy lymph nodes are unnecessarily removed and, importantly, lymph node removal is associated with severe side effects (e.g. lymphedema).

### Invention

A non-invasive imaging method has been developed which has potential to be more sensitive in detecting metastases bearing lymph nodes than currently applied technologies. The technology may replace regional lymph node dissection for prognostic and diagnostic purposes in cancer patients. The technology implies non-invasive imaging of lymphatic vessel expansion (lymphangiogenesis) in lymph nodes due to cancer or inflammation, with the use of lymphatic vessel specific antibodies (Fig. 1). Since lymphangiogenesis is associated with cancer and a number of other diseases – including inflammatory diseases such as rheumatoid arthritis – this technology can also be applied to monitor these diseases.

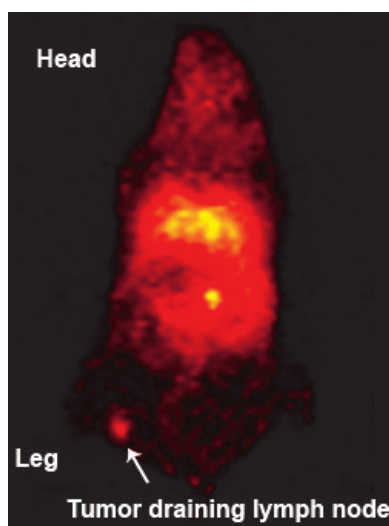


Fig. 1: Non-invasive imaging of lymphangiogenesis in lymph nodes in a mouse due to cancer. Imaging is based on lymphatic vessel specific antibodies using PET.

### Features & Benefits

- Earlier and non-invasive prognosis and diagnosis of cancer metastasis
- Very sensitive method to detect metastases bearing lymph nodes
- Potential to avoid healthy lymph node dissection and related side effects (e.g. lymphedema)
- Improvement in patients' quality of life
- Method to detect inflammation in lymph nodes

### Field of Application

- Cancer prognostics and diagnostics, in particular for cancer types which metastasize via lymphatic vessels, e.g.:
  - Breast cancer
  - Melanoma of the skin
  - Prostate cancer
  - Bladder cancer
- Research and monitoring of lymphangiogenesis in inflammatory diseases, e.g.:
  - Rheumatoid arthritis
  - Psoriasis

### References

- Hirakawa S, et al. J. Ex. Med., 2005. VEGF-A induces tumor and sentinel lymph node lymphangiogenesis and promotes lymphatic metastasis.
- Hirakawa S, et al. Blood, 2007. VEGF-C-induced lymphangiogenesis in sentinel lymph nodes promotes tumor metastasis to distant sites.

Ref. No. T 08-108

ETH Zurich  
ETH transfer  
Zurich, Switzerland

+41 44 632 23 82  
transfer@sl.ethz.ch  
www.transfer.ethz.ch

**ETH**

Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich