# Prediction of Brain Metastasis Using Biomarkers of Circulating Tumor Cells

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## Technology description

### Market Opportunity

Circulating tumor cells (CTCs) have been gradually gaining momentum as a prognostic tool to monitor tumor progression, recurrence, and metastasis in a minimally invasive manner. Application of CTCs for clinical care, however, are limited by the need for highly sensitive and specific analytical methods. Identification of robust biomarkers are critical to advance the utility of CTCs in cancer treatment.

### USC Solution

Researchers at USC have identified semaphorin 4D (SEMA4D) and MYC as CTC-derived markers to predict brain metastasis in breast cancer patient-derived CTCs. In vivo studies showed that expression of SEMA4D in non-brain tropic CTCs significantly promotes the ability of the cells to infiltrate the brain. MYC on the other hand was found to promote colonization of tumor cells in the brain, with co-expression of SEMA4D and MYC triggering higher brain metastatic activity. Thus, this invention provides a method of determining the brain metastatic potential of cancer cells, including CTCs.

### Application area

CTC-based prediction of brain metastasis potential
Potential therapeutic targets for brain metastasis

### Advantages

Early prognostics of metastatic potential
Minimally-invasive prediction of brain metastasis
New therapeutic targets for prevention of brain metastasis

### Institution

University of Southern California

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