

Recent advances in targeted cancer therapies, such as the development of drugs like Herceptin, have given doctors a better arsenal with which to treat patients diagnosed with primary breast cancer, resulting in better disease control, increased long-term survival, and quality of life. However, even as the outcomes of primary breast cancer patients improve, the incidence of deadly breast cancer brain metastasis has actually risen. While primary and metastatic breast cancer both originate in the breast, they are incredibly dissimilar diseases; breast cancer cells growing in the brain face an entirely unique set of obstacles and opportunities for growth in the brain that do not exist in their native breast environment. However, efforts by the research community until now have focused almost entirely on primary breast cancer; breast cancer metastasis, especially brain metastasis, remains understudied and underfunded. Because of this systematic neglect, breast cancer brain metastasis diagnosis remains a death sentence.

Dr. Yu's group proposes to change this system. By using human cancer cell lines in animal models, they have screened a set of pro-growth human proteins, termed kinases, for their contribution to breast cancer brain metastasis formation. In this screen, they have identified that several proteins support the growth brain metastasis. The METAvivor grant will be used to validate which of these proteins are the most important in driving metastatic growth, and may therefore serve as the best therapeutic targets. While intensive studies remain to be performed, Dr. Yu believes that this research that may lead to the first generation of brain metastasis-targeted therapies and soon deliver to breast cancer brain metastasis patients the one thing the current system does not offer: hope.