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# Lim Yoon Pin

*National University of Singapore, Singapore*


## Companion diagnostics for Trastuzumab based neoadjuvant therapy: Two is better than one

Total sales of oncology drugs in 2017 was >USD50 billion and Herceptin was the 3rd top selling drug with about USD7 billion sales. Her2+ breast cancer is forecasted as the highest-growing segment of breast cancer treatment market to increase by 2.5 fold by 2023. Herceptin has a compound annual growth rate of 9.88% going from $4.95 billion in 2013 to $12.7 billion in 2023. While Trastuzumab-based chemotherapy has shown remarkable clinical benefits for HER2-positive breast cancer patients, a subset of patients (30-40%) shows little or no effect. This highlights an important clinical need for biomarkers in addition to Her2 for better stratification of patients for precision medicine of Her2+ breast cancer. Her2+ breast cancer is associated with an amplification of the HER2 locus in chromosome 17q. We hypothesized that HER2 and its co-amplified genes in C17q not only form a molecular network but also cooperatively and functionally contribute to the phenotype of Her2+ breast cancer. In other words, the Her2-associated genes may regulate the response of Her2+ breast cancer to drugs and are therefore potential companion diagnostics for HER2-based therapeutics. To this end, my lab has created an *in silico* network of genes in C17q that are co-amplified with Her2 in breast cancer. In my talk, I will describe a recent multi-center, cross border retrospective proof-of- concept study, which establishes that women who are <50 years and with Her2-positive breast cancers that overexpressed a Her2-associated gene (WBP2) had better pathologic complete response to Trastuzumab-based neoadjuvant therapy of 78% compared to 40% in non-stratified Her2-positive breast cancer. The findings allow clinicians to better plan therapeutic interventions for patients. Being able to predict which patients would attain successful downstaging of their tumors from neoadjuvant therapy would also guide surgical decisions e.g. breast conserving surgery versus mastectomy. Consequently, this would improve the overall patients' outcome.

## Biography

Lim Yoon Pin is currently working as an Assistant Professor at National University of Singapore. He is a Principal Investigator and Heads the Laboratory of Molecular and Translational Cancer Research at the Yong Loo Lin School of Medicine. He has completed his PhD from the Institute of Molecular and Cell Biology, Singapore. His current interest is the translation of the understanding of the oncogenic function, mode of action and regulation of WBP2 in epithelial cancers from bench to bedside including molecular diagnostics and targeted therapeutics.

bchlyp@nus.edu.sg