

Prof. Jenny Chang: to understand cancer stem cells, to find new ways to overcome cancers

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Expert's brief introduction

Dr. Jenny C. Chang (*Figure 1*) is the Director of Houston Methodist Cancer Center and Emily Herrmann Chair in Cancer Research in Houston, Texas. She obtained her medical degree at Cambridge University in England, and then completed fellowship training in medical oncology at the Royal Marsden Hospital/Institute for Cancer Research in the United Kingdom. She was also awarded a research doctorate from the University of London. Her recent work has focused on the intrinsic therapy resistance of cancer stem cells, which has led to several publications and international presentations. Dr. Chang's clinical research aims to evaluate novel biologic agents in breast cancer patients.

During Dr. Chang's recent visit to Shanghai, the editorial office of *Annals of Breast Surgery (ABS)* had the great honor to do an interview with her (*Figure 2*).

Interview

ABS: *As a leading expert in breast cancer research and treatment, can you give a general picture of breast cancer in the USA? Which kind of breast cancer is the most popular? Any changes in recent years?*

Prof. Chang: I think the overall breast cancer in the US and in the most of Western Europe is in estrogen-receptor (ER) postmenopausal women, which still contributes to the majority of all breast cancers, with more than 60% being ER-positive and generally in postmenopausal women. HER2 positive and triple negative will comprise the remaining 35%.

ABS: *What's the challenge in treating triple-negative breast cancer currently?*

Prof. Chang: I think there are lots of differences now. Over the past 10 years or so, ever since the human genome project and with the next-generation sequencing of a lot



Figure 1 Prof. Jenny Chang.



Figure 2 Prof. Jenny Chang: to understand cancer stem cells, to find new ways to overcome cancers (1).

Available online: <http://www.asvide.com/watch/32968>

of tumors, we're basically beginning to understand the heterogeneity in breast cancer, especially triple-negative breast cancer which has at least three subtypes. What's emerging is some commonality in treatments. Most importantly in patients with germline mutation *BRCA1* and *BRCA2*, poly(ADP ribose) polymerase (PARP) inhibitors are emerging as a very viable therapeutic option and it's actually currently FDA-approved. So, we are still waiting to actually review the data of some related research as well

as the antibody-drug conjugates. I think finally what is very exciting is the possibility of combinatorial therapies, whether you combine PARP inhibitors together with immune checkpoints, and different other agents that can actually alter the tumor microenvironment. These are areas of intense research which I think will help more and more women live longer with the disease.

ABS: *What's the new principle to treat triple-negative breast cancer? Any possibility to conquer it?*

Prof. Chang: It's a heterogeneous disease, so understanding the subtype of triple negative breast cancer and the eukaryote germline mutation in *BRCA1* and *BRCA2*, learning about new DNA repair mechanisms, looking at antibody-drug conjugates and how to combine those checkpoints are all the intense area of research. We are revisiting this whole area, looking at so many ways in which we can actually activate the immune system and all these new antibody drug conjugates. This is a very exciting time.

ABS: *How do you see the future of breast cancer treatment?*

Prof. Chang: I think we are doing very well. Year on year we have new therapies and new ways in which we can tackle a problem, and patients are living much longer today with metastatic disease. It's gratifying that in my 20 years as a breast cancer physician and researcher, we've had so many approvals and it's very nice so that patients have so many more options. I think we do cure a lot of people and we have so many more therapies. Therefore, hopefully, one day we would be able to say to patients that you would cure.

ABS: *Can you talk about your most recent research? Which specific questions you are going to address?*

Prof. Chang: What we have done recently, I think it's quite interesting, is that we've always focused on cancers stem cells. What we are finding now is these cancer stem cells phenomenon is very much tied up with hypoxia and the tumor microenvironment. We're looking at ways in which inflammation of the tumor microenvironment actually makes the cancer stem cells survive and the tumor not responsive to conventional therapies as well as immune checkpoints. We can actually make the tumor microenvironment more conducive to new checkpoints. All

of the above is ongoing and it's pretty exciting.

ABS: *You are a world-renown clinical investigator and have led or participated in numerous research work.*

Looking back, what is your proudest achievement? Any story behind the success?

Prof. Chang: When I first started my career, I left the UK and I went to the US. This was the era where target therapies with Herceptin were basically being used in the metastatic setting. We weren't the very first to use targeted therapies in early breast cancer and in the neurological setting, the preclinical setting, and pre-surgical setting. We did that without chemotherapy and we saw that a large number of women actually responded to targeted therapies alone without chemotherapy. Being instrumental, I think in some of the design of the early chemo-free treatment, new adjuvant targeted therapies have been some of my proudest moments. It has helped so many women. Additionally, I think the understanding of cancer stem cells, finding ways in which we can overcome human resistance, not only understanding the tumor microenvironment but also understanding what makes the microenvironment so hostile to treatment, trying to work out these mechanisms are very significant. I think it's still very interesting. I hope in the future, we can actually contribute a little bit more.

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