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# Immune Therapy for Patients with Breast Cancer

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Breast cancer is the second leading cause of cancer-related death in women and new treatments are urgently needed. Immunotherapy has been a game changer in some tumor types, but have been less effective in breast cancer perhaps due to breast cancer's ability to create an environment in the tumor that prevents the immune system from eliminating tumor cells, called an immuno-suppressive tumor microenvironment. Novel immunotherapies harness the body's immune system to fight cancer, holding great promise to prevent tumor recurrence and prolong survival. Over the last year our labs have been studying new strategies to decrease these suppressive signals within the tumor, allowing anti-tumor signals to successfully eliminate tumor growth. We are also investigating differences in anti-tumor immunity in early stage breast tumors as compared to breast tumors that have spread or metastasized to areas outside the breast such as to the lung and liver.

Characterization of these differences are helping to identify how we can overcome immune therapy resistance, critical in developing treatment strategies for patients with breast cancer, and building augment immune therapy to work better according to where the majority of a patient's breast cancer is growing. We have identified that breast cancer growing in the lung has more suppressive cells than that growing in the breast. Using mouse models we have been able to test new combinations of immunotherapy that target these suppressor cells in the lung and we are working to determine if this strategy will improve response rates to already approved types of immune therapy.

Building on the work from last year, we are currently investigating novel ways to overcome resistance mechanisms and bring our laboratory research to clinical practice. We have several ongoing and planned studies. We are excited to let you know that we are completing the enrollment of patients to the lmmunoADAPT study, which is investigating if CDK4/6 inhibitors can augment immune responses in patients with early-stage hormone receptor positive breast cancer, a subtype of breast cancer notoriously resistant to immunotherapy. We are also completing a study or entinostat and 2 immunotherapy agents and expect to report our results in the near future.

We plan on initiating our correlative analyses, which will include evaluation of immune cells in the tumor microenvironment, and functional assays to determine the mechanism of action. Another area of interest is how low oxygen states, hypoxia, can result in upregulation of immune evasion mechanisms particularly related to adenosine metabolism. The INDALA study, which will open to accrual this year will investigate if adenosine receptor inhibitors in addition to immunotherapy can overcome this resistance mechanism in patients with early stage triple negative breast cancer. In this study we are collaborating with internationally renowned scientists Elizabeth Jaffee and Gregg Semenza. We thank you for your generosity and look forward to sharing our ongoing and planned studies with you.