Overcoming Therapy Resistance in Breast Cancer

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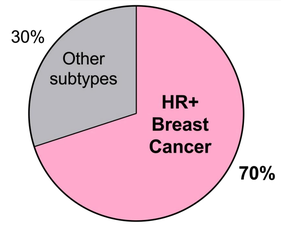
Anschutz CANCER BIOLOGY

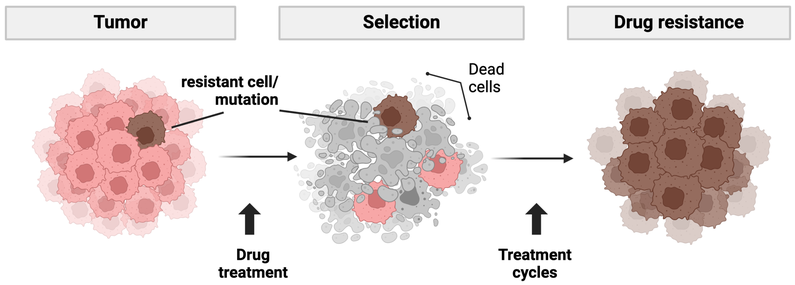
What is HR+ breast cancer?



Hormone receptor-positive (HR+) breast cancer:

Cancerous cells receive signals from the hormones, causing them to grow

What is therapy resistance?

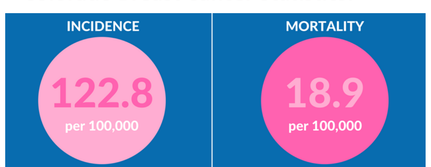


Despite the abundance of available therapies for HR+ breast cancer, **resistance to therapy** remains a persistent, ongoing problem in the field. Most commonly, endocrine therapy, which targets the hormone receptors, often inhibits tumor progression at first, but does not work long term. This is because tumor cells have (or develop) **mutations that allow them to "hide" from the therapy**, and the cells with this mutation survive, allowing a **resistant tumor** to form.

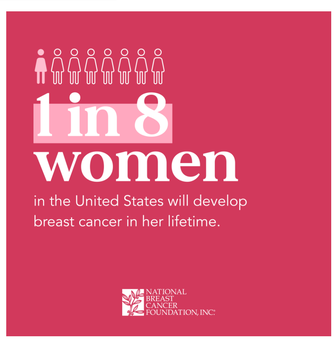
Why do we care?

One in eight women in the U.S. will develop breast cancer in their lifetime.

Colorado Breast Cancer Statistics:



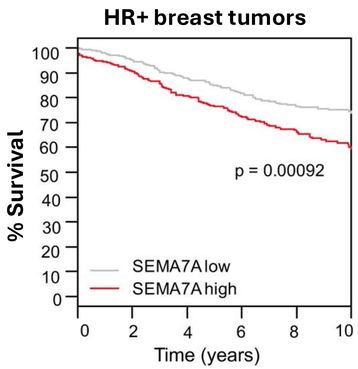
(Colorado Cancer Coalition)

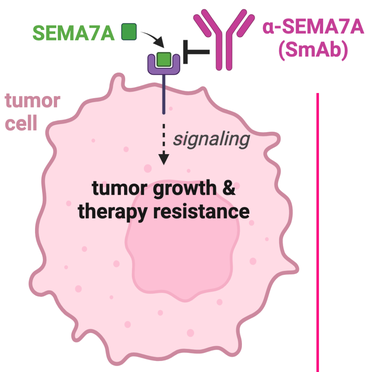


What is Semaphorin 7a?

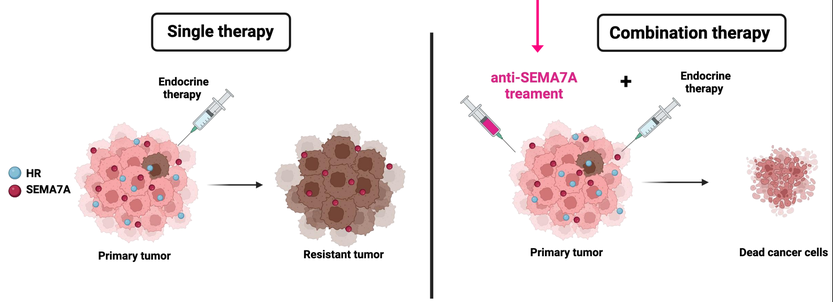
Semaphorin 7a (SEMA7A) is a molecule expressed on tumor cells. Patient survival depends on expression of SEMA7A on their tumor.

SEMA7A → patient survival



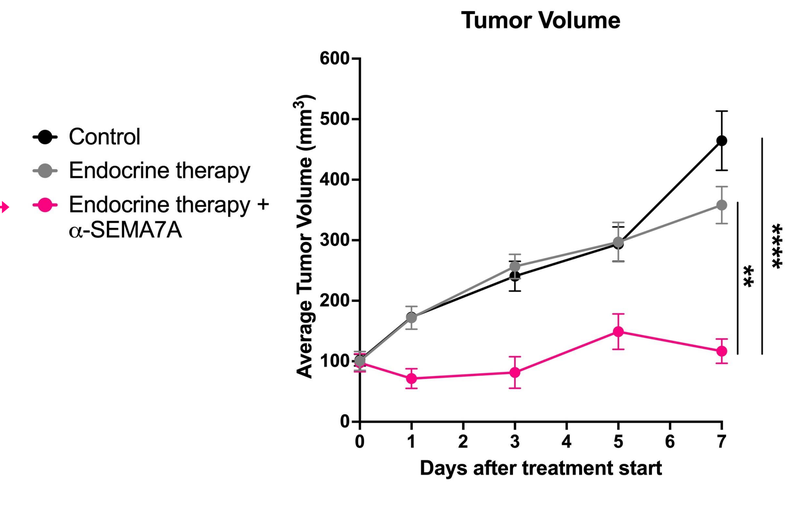


Methods we used



Our studies explore a **new treatment avenue**: a **novel SEMA7A-targeted therapeutic** in combination with endocrine therapy. Combination therapy with anti-SEMA7A treatment can overcome resistance by attacking a **secondary target** on the tumor. Anti-SEMA7A therapy also makes the tumor **less likely to become resistant to therapy** in the future.

What we found



Tumor growth was inhibited significantly after treatment **with anti-SEMA7A (SmAb)** + endocrine therapy, compared to endocrine therapy alone or the control group. These **preclinical** data support the need for clinical testing of anti-SEMA7A treatment in the future.

Clinical implications

Our goal is to improve treatment strategies and **survival outcomes** of cancer patients. There are **currently no medical interventions** that target Semaphorin-7a. Our research suggests that SEMA7A-targeted therapeutics should inhibit tumor growth in HR+ breast cancer patients. While these are preclinical studies, the results are promising and could **lead to clinical trials of anti-SEMA7A therapy** in the near future. Further, anti-SEMA drugs could serve as potential therapies for **other types of cancer** in the future.