G4 Cancer Cure

INCREASED PATIENT SURVIVAL IN BREAST CANCER

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Market need and potential

Cancer is among one of the world's most common diseases, and the number of affected patients increases yearly. Thus, cancer is a significant and rising health concern whereby new innovative treatment approaches are desperately required. The most common cancer in women is breast cancer. These patients receive a combination of treatments to enhance the effectiveness of killing and removal of the cancer cells. A common combination is surgery and chemotherapy. However, single-target chemotherapy often leads to drug-resistant cancer cells and consequently to unsuccessful treatment. As our need analysis indicated, the market is in need for improved cancer drugs with either reduced toxicity, increased patient survival or diminished cancer recurrence. Therefore, the market (pharma) is actively looking for drugs to test in clinical trials that have the potential to bring improvements to the quality and length of life of cancer patients.

Business idea

Single-target chemotherapy often leads to drug-resistant cancer cells and consequently to unsuccessful treatment. With our innovation that targets two pathways with one drug, we will reduce the chance of drug-resistance and increase the probability of successful treatment. Furthermore, because cancer cells contain more G-quadruplex DNA structures than healthy cells do, targeting cancer via the G-quadruplex DNA pathway confers selectivity to the treatment. Because we selectively increase DNA damage in cancer cells, this approach has an advantage over the current DNA damaging targeting drugs on the market which are also harmful for the healthy cells. Our compound will therefore be more effective against cancer cells, which will reduce the risk of drug-induced side effects.

Competition

Today, there are no compounds that target both the STAT3 protein and G-quadruplex DNA. One quadruplex stabilizer is in Phase I/II trials to treat breast cancer (Senhwa Biosciences Inc.). Despite great promise, there are no drugs targeting STAT3 on the market, which suggests that single pathway STAT3 inhibition is unlikely to be clinically impactful, further strengthening our strategy to simultaneously target STAT3 and G-quadruplex DNA.

Advantages

The benefits of our innovation are four-fold: reduced *side-effects*, lower risk of *drug resistance*, low *production costs*, and low *socio-economic costs*. Because our drug targets two pathways, *drug-resistance* will be *reduced,* which can result in more efficient cancer cell death and consequently a higher success rate of the treatment. Our treatment approach will be more selective to cancer cells compared to healthy cells, and therefore will reduce *side-effects* on healthy cells. Our innovation is a small molecule and thus *more cost-effective* to produce compared to antibodies that are currently used in cancer therapy. These improvements would *reduce the socio-economic costs* that are connected to cancer.

Current status

Human cell experiments have shown that the drug is very selective for inhibition of STAT3 and G-quadruplex DNA structures. Breast cancer cells are more sensitive to our molecule compared to non-cancerous breast cell lines. This confirms the great promise of our drug in the treatment of breast cancer. We will now initiate the verification of our compound in a whole murin model of breast cancer.

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IPR

Patent application submitted; decision expected in December 2020.

Capital need

5–10 MSEK/year

Partnership

We are currently seeking funding/expertise/networking.

Team / Scientific advisors

Nasim Sabouri, PhD, Molecular Biologist, Associate Professor

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Background

Breast cancer, the most common cancer in women, needs improved drugs to increase patient survival. Our innovation, a small molecule that simultaneously affects two well-recognized cancer targets, the STAT3 protein and G-quadruplex DNA structures, will reduce drug-resistance and improve treatment.