Chili pepper, and keeping cancer under control

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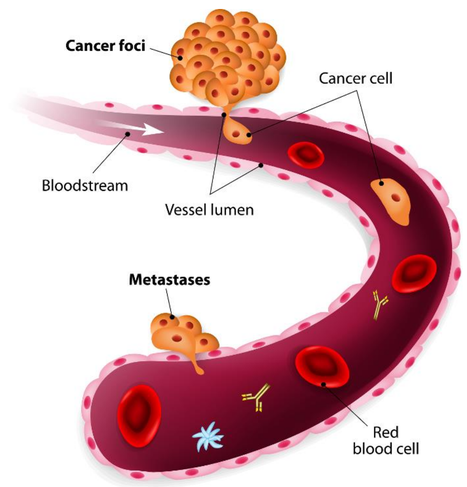
Problem

Worldwide, each year almost 8 million people die of cancer. Anti-cancer therapies may lead to successful removal of primary tumors and metastases.

However circulating tumor cells (CTCs) in the blood stream remain a ticking time bomb, sooner or later leading to new metastases.

A complete cure or control of cancer requires that CTCs are removed or neutralized. The preferred therapy is the one that causes minimum burden to the patient.

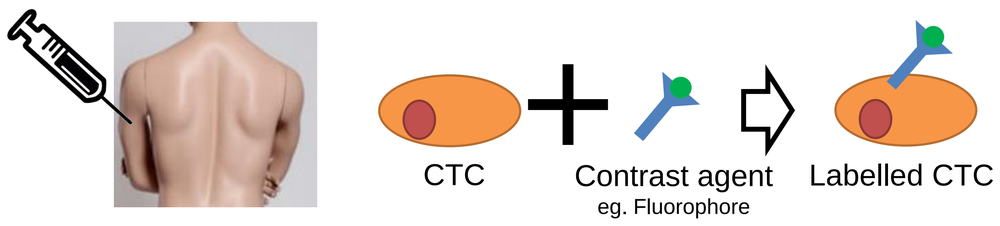
Here is where the **chili pepper project** comes in!



Proposed: Chili pepper project

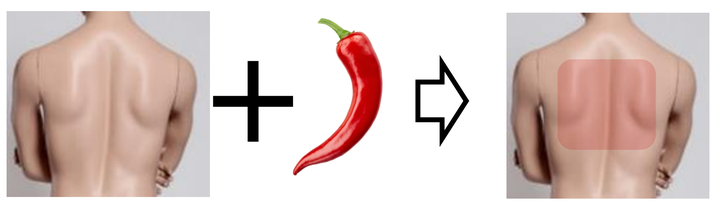
The envisioned therapy consists of the following steps:

1) Labelling the CTC with an optical contrast agent for detection.

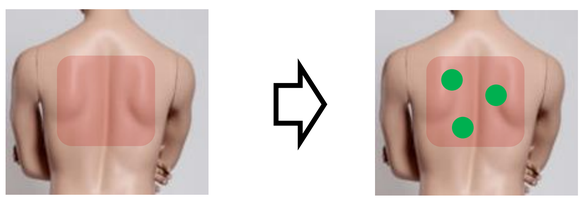


2) Elevating blood perfusion in a large skin area;

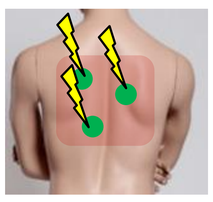
For this, chili pepper based capsaicin cream is used. This cream allows to enhance skin perfusion with a factor of 10-20.



3) Detection of CTCs presenting themselves in the therapeutic window.



4) Non-invasive destruction of CTCs by the use of light or ultrasound.

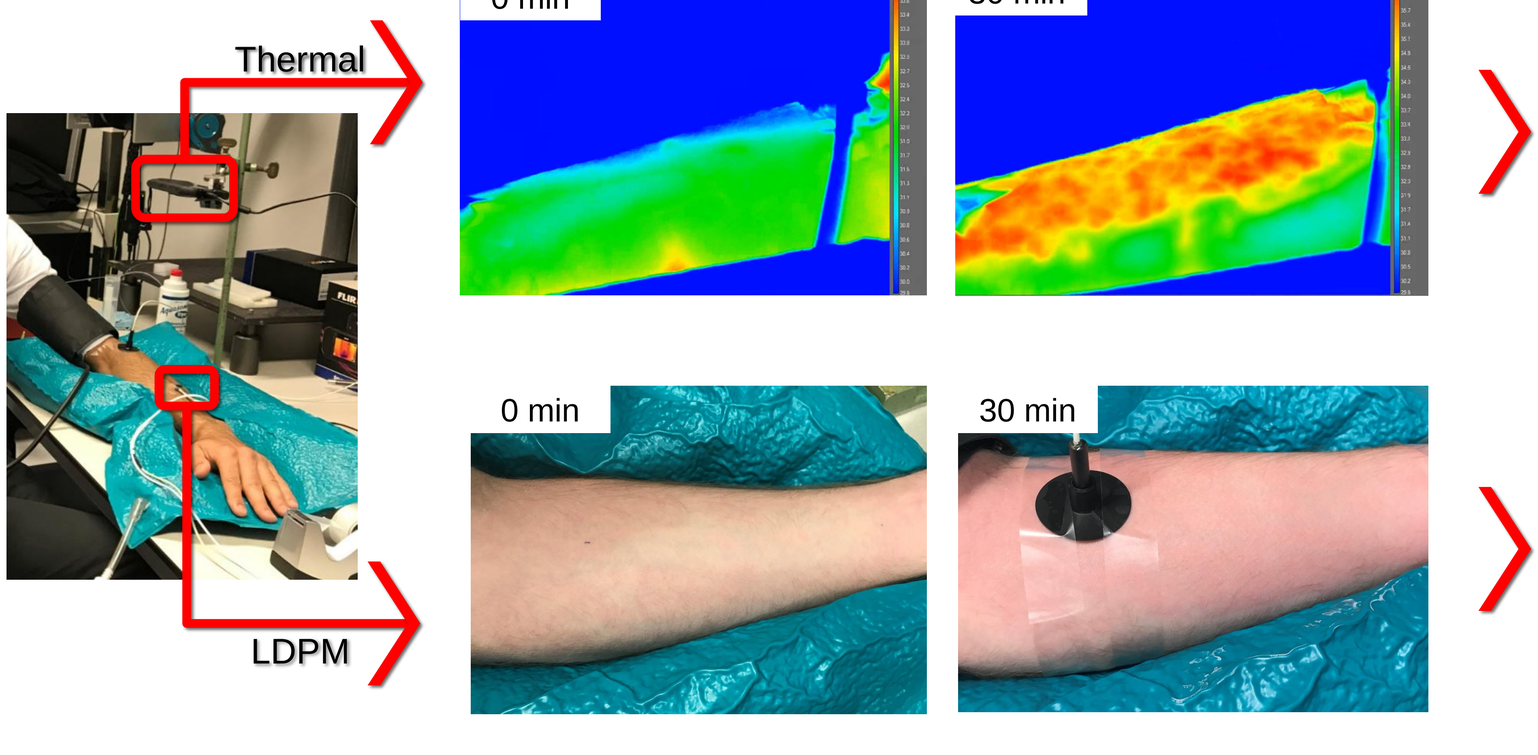


Advantages

- Low stress for the patient.
- Non-invasive.
- Reduced treatment time.
- Reducing metastasis?

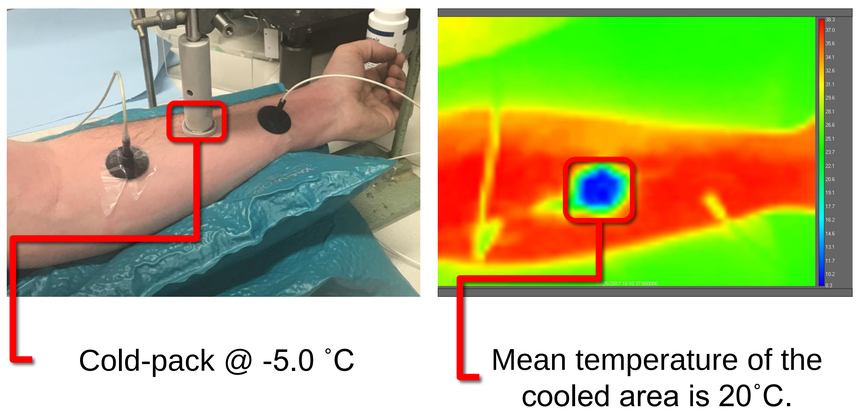
Current Focus: Elevating blood perfusion

Determine quantitative perfusion of the skin using Laser Doppler Perfusion Monitoring (LDPM) and Thermal Imaging over time.



Further investigation

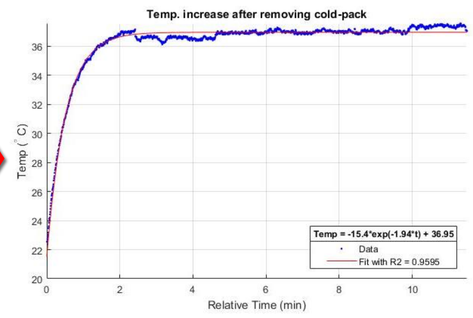
Cooling of the skin:



Cold-pack @ -5.0 ˚C

Mean temperature of the cooled area is 20˚C.

The temperature change after removing the cold-pack:



By fitting the change, the amount of required blood can be estimated.

Future goals

- Modeling of blood flow related to change of perfusion and temperature.
- Implementing LDPI measurements using the TopCam.
- Determining optimal treatment location.
- Develop skin phantoms.

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