Diagnostic and therapeutic applications of molecular profiling in a given malignancy

Projects:

Build a project around cancer patient care and quality of life. Students will have to think about the unmet human, societal, administrative, and medical needs of patients suffering from cancer at given stages of their disease course.
Students propose a project on clinical/pre-clinical trial design innovation or quality-of-life support for patients with cancer.
Students can also continue the development of the following project:

In Switzerland, breast cancer is the most frequently diagnosed cancer in women. Although still a leading cause of cancer-related death, mortality from breast cancer has decreased considerably over the last decades, thanks to the use of mammography screening programs permitting diagnosis at early stages and improved surgical and medical treatments. Forty percent of women diagnosed with breast cancer still require a mastectomy to cure their disease. Phantom breast syndrome (PBS) is a condition in which patients develop a sensation of residual breast tissue, frequently accompanied by neuropathic pain. Although of varying estimated incidence in the literature, its prevalence surrounds 10-55% of patients undergoing this surgical procedure. Compared to its more famous related syndrome, phantom limb pain, research on PBS is still sparse and inconclusive. Therapeutic interventions for this type of pain include oral medications such as opiates and antidepressants, in addition to topical agents. However, there is no preventive treatment aiming at reducing the incidence of PBS and medical treatments have limited efficacy once this type of chronic pain is installed. To adapt the treatment to PBS, we have reached out to the EPFL-ECAL Lab. Three set-ups are currently being developed: the first uses a chair with a fixed mirror (image below) along the sternum. A second mirror is then in front of the subject which allows them to see their reflection. The second option consists of a digital mirror, where the patient sits in front of a digital screen. The screen shows a mirror image of the patient, except the affected breast is replaced by the mirror image of the other breast. The third treatment arc would utilize virtual reality headsets to allow the patient to see their body in first-person view. Goals: initiate translational collaboration with hospitals, improve the devices, and raise funding.

Learning objectives:
- Gain knowledge about a specific type of tumor in order to realize the nosological heterogeneity of cancer.
- Gain Knowledge about diagnostic procedures (radiological staging), sample collection (e.g. tissue biopsy, cytology, resections, blood samples) and their degree of invasiveness.
- Get a vision of currently used technological platforms in molecular diagnostics.
- Approach translational research and clinical trials.

Contact persons:
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