

Ivy Foundation and Stanford University MRI and PET Tumor Imaging Advances

PRINCIPAL INVESTIGATORS:



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OBJECTIVES:

- PET, MRI and MRS can be used to image not just how organs look like, but also different processes that are involved in different diseases, including cancer and GBM.
- While PET and CT were combined in a single machine since 2002, combining PET and MR in a single scanner is a much more challenging process. Having a combined PET MR scanner is very important for brain imaging and Stanford's scientist work on solving the challenges.
- One needs more than good treatments, good ways to detect disease and assess response to treatment are also needed in GBM.
- Marry molecular imaging to state-of-the-art adoptive immunotherapies for GBM to monitor cell delivery and therapy response.
- Phase 1 trials are very exploratory clinical research projects that try for the first time in humans new therapies or diagnostic probes. Develop software tools for combining information from multiple types of imaging studies.
- Having a lot of new information from novel tests requires new ways to integrate and display this information. So new software is needed.
- Blood tests may be developed to evaluate if disease is present or not, but imaging is needed to pinpoint where the disease is located. Conversely, the imaging test will perform better if a blood test will tell us that there is disease present somewhere in the body.

PROGRESS REPORT:

- MRI uses contrast agents to increase the chance of detecting disease left after surgery (the surgeon cannot see every cancer cell with the naked eye). These agents that have been developed are cancer specific.
- 18F FLT (fluorothymidine) images how cells multiply (DNA synthesis). Cancer cells multiply much faster than normal cells and therefore this new imaging agent may provide better information about the presence of cancer cells in the brain.
- In collaboration with General Electric, Stanford is installing the first integrated MRI-PET scanner in the world.
- Glutamine is a substance that is required for the energy needs of the cells. Cancer cells have higher energy needs for growth and use more glutamine. Therefore this new imaging agent may be helpful as well.
- Very small speheres (nano-particles) can be reliably produced such that they attach very specifically to certain processes involved in cancer. By attaching different substances to these spheres, one can use different imaging modalities (PET, MRI, optical) to image where they are distributed in the body.
- A first of its kind MRI-PET system for clinical imaging has been assembled with encouraging pilot images and is on track for delivery to Stanford in 2013.

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