

AbstractID: 7972 Title: Functional imaging

Functional imaging is being increasingly used in radiation therapy for target definition and treatment planning. In this talk I will summarize recent advances in functional and molecular imaging techniques and discuss various issues related to the integration of the newly emerged imaging data into radiation therapy planning. In particular, techniques of time resolved 4D PET acquisition will be discussed and a few methods of enhancing 4D PET images will be described. It is anticipated that the new imaging modalities will make significant impact in cancer diagnosis, staging, treatment planning, and monitoring of therapeutic response. The potential impact of biologically conformal radiation therapy (BCRT) or biologically guided radiation therapy (BGRT) will be discussed. Finally, issues related to the quality assurance of functional and molecular imaging and BCRT will also be addressed.

Educational objectives:

1. Introduce the concept of functional and molecular imaging.
2. Illustrate the steps involved in integrating molecular imaging such as PET and MRSI into treatment planning process.
3. Introduce PET/MRI/MRSI and CT image fusion techniques (including deformable image registration).
4. 4D PET data acquisition and image enhancement.
5. Provide an overview on recent advances in PET/CT and MRSI, and update on the development of new PET tracers and data acquisition techniques.

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