Definition of Targeted Radiotherapy

Targeted radiotherapy is a form of cancer treatment in which radioactive substances are delivered **specifically to tumor cells** or tumor-associated structures, minimizing exposure to healthy tissues.

Key aspects include:

- **Specific Targeting**: Radioactive molecules are attached to ligands (such as antibodies, peptides, or small molecules) that recognize and bind to tumor-specific markers (e.g., PSMA in prostate cancer or glioblastoma neovasculature).
- **Localized Radiation**: After binding to the target, the radioactive component emits radiation (commonly beta or alpha particles) that destroys cancer cells in the immediate vicinity.
- **Reduced Side Effects**: Compared to conventional external beam radiotherapy, targeted radiotherapy offers greater precision and reduces collateral damage to normal tissues.

Examples:

- **^{177}Lu-PSMA-617 therapy** for prostate cancer and glioblastoma.
- **^{177}Lu-DOTATATE therapy** for neuroendocrine tumors.