Microbeam Radiation Therapy

Avraham Dilmanian, Ph.D.
BNL Medical Department
and
Stony Brook Radiation Oncology
The “Volume Effect” in Radiation Therapy

- The threshold dose for damage to normal tissues increases as the irradiated tissue volume is made smaller.
- Such observations lead to the development of grid radiotherapy, and, later, stereotactic Radiotherapy.
- However, at sub-millimeter beam sizes this effect is suddenly enhanced by 30-fold (the microbeam effect). It was first observed first using a 25-MeV deuteron beam on the mouse cerebellum.
Microbeam Radiation Therapy (MRT) - Concept for tumor therapy
Mechanisms of normal tissue sparing: Current hypothesis

Lost capillary segments are replaced by new segments sprouting from endothelial cells and pericytes.