

University of Maryland School of Medicine Department of Radiation Oncology

GammaPod



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FLASH



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More than 50 patients have been enrolled in GammaPod clinical trials at UMMC and our community sites.

The **GammaPod** system was invented in 2006 in the Department of Radiation Oncology and advanced through multiple phases of development to clearance by the U.S. FDA in 2017. It is now offered in routine treatment and clinical trials at the University of Maryland and other centers in the U.S. The GammaPod is in clinical use in Italy with additional international installations underway. More than 180 patients have been treated at Maryland, with high rates of reported satisfaction and low side effect profiles.

The GammaPod, located at UMMC, offers noninvasive radiation treatment in women with early-stage breast cancer. Advantages and innovations include:

- 3D pinpointing of tumor location, with a novel custom-fitted cup design
- Potential abbreviation of the number of treatments, improving convenience and quality of life and reducing cost
- In select patients, potential for elimination of need for surgical tumor removal.

Under the direction of **Elizabeth M. Nichols, MD**, the international GammaPod Research Consortium includes organizations that have or plan to use this innovative technology. Physicians and scientists are actively involved in clinical trials and other investigations to determine which breast cancer patients will benefit most from GammaPod therapy. The consortium works to:

- Define the clinical utility of the GammaPod system in breast cancer
- Identify optimal applications in specific disease stages and presentations
- Participate in sharing robust and replicable data on these activities.

In 2020, the department made a \$1.8 million commitment across all 3 of our divisions to elucidate the basic science of high-dose-rate **FLASH radiotherapy** techniques, conduct/report on translational studies, and implement the knowledge gained in clinical applications. This unusual self-investment effort positions the department at the forefront of a technique with the potential to revolutionize radiation treatment and expand understanding of related basic radiation biology. Under the direction of **Amit Sawant, PhD**, we have completed major technology realignment and launched a range of associated basic and translational activities, including:

- Decommissioning and converting a linac to an electron FLASH delivery system at UMMC and enabling FLASH beam technology at MPTC
- Installing a small-animal radiation research platform at MPTC for more complex studies that more closely mirror clinical applications and enable documentation of basic technical parameters for future clinical regimens
- Developing novel high-speed dosimeters and plasmid DNA-based biological dosimeters to characterize and validate FLASH RT experiments
- Conducting a program in preclinical FLASH research in DTRS under the direction of **France Carrier, PhD**, to evaluate mechanisms underlying ultra-high-dose-rate effects on normal and tumor tissues.

The GammaPod system was developed and commercialized through the UMB Office of Technology Transfer, including MIPS support.

In 2022 an MD, PhD RadOnc resident received a prestigious RSNA research award to advance understanding of FLASH effects.