

Gamma Probe for Revealing Cancerous Cells

**Anastasia Yagnyukova¹, Dmitry Mikhaylov², Timur Khabibullin³,
Andrey Grigorenko⁴ and Leonid Panfilov⁵**

*National Research Nuclear University "MEPhI" (Moscow Engineering Physics Institute),
Kashirskoe highway 31, 115409, Moscow, Russian Federation*

E-mail: ¹<yagn.anastasia@gmail.com>, ²<dmmikhajlov@mephi.ru>,

³<tkhabibullin@ecmephi.ru>, ⁴<agrigorenko.mail@ecmephi.ru>, ⁵<lapanfilov@ecmephi.ru>

KEYWORDS Gamma Probe. Gamma Ray Detection. Cancer Detection. Lymph Node. Radiopharmaceutical

ABSTRACT This paper deals with the development of the compact wireless gamma probe for malignancies diagnostics. It defines the location of a 'guardian' lymph node (the lymph node closest to the tumor) and defines the size of the tumor, helping establish the stage of disease, the radicalism of the forthcoming operation and the subsequent treatment methods. The gamma probe detects gamma radiation from radiopharmaceuticals accumulating in places of concentration of metastasis, thus revealing cancerous lymph nodes. This paper provides a description of the gamma probe prototype. The main characteristics of the gamma probe were measured, and some problems and were discovered, along with possible solutions. Simulation of the gamma probe was run to determine the optimal configuration of the collimator. Some tests on laboratory animals were run, yielding important measurements, which proved the prototype gamma probe able to quickly and accurately locate the areas of the radiopharmaceutical's densest concentration within the body.