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## Paving the way to personalized medicine: production of some theragnostic radionuclides at Brookhaven National Laboratory

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This presentation will introduce a relatively novel paradigm that involves specific individual radionuclides or radionuclide pairs that have emissions that allow pre-therapy low-dose imaging plus higher-dose therapy in the same patient. We have made an attempt to sort out and organize a number of such theragnostic radionuclides and radionuclide pairs that may potentially bring us closer to the age-long dream of personalized medicine for performing tailored low-dose molecular imaging (SPECT/CT or PET/CT) to provide the necessary pre-therapy information on biodistribution, dosimetry, the limiting or critical organ or tissue, and the maximum tolerated dose (MTD), etc. If the imaging results then warrant it, it would be possible to perform higher-dose targeted molecular therapy in in the same patient with the same radiopharmaceutical. A major problem that remains yet to be fully resolved is the lack of availability, in sufficient quantities, of a majority of the best candidate theragnostic radionuclides in a no-carrier-added (NCA) form. A brief description of the recently developed new or modified methods at BNL for the production of a number of theragnostic radionuclides, whose nuclear, physical, and chemical characteristics seem to show great promise for personalized cancer therapy will be described.

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