G. OVERALL BENEFIT

The Institute for Innovation in Imaging was founded in 2014 to provide a translational platform to develop and bring new imaging technologies into clinical use. The Institute is part of the Department of Radiology and integrated with the Athinoula A. Martinos Center for Biomedical Imaging and the thematic Center for Systems Biology, both at MGH. The Institute for Innovation in Imaging is a diverse community of researchers, many of whom are funded with NIH support, working at the cutting edge of new imaging technologies that will further advance our fundamental understanding of human health and disease. Research here focuses not only on developing new imaging technologies, but also on translating those technologies into clinical applications. This requires a highly collaborative environment and demands access to the latest in scientific instrumentation.The acquisition of the proposed Ga-68 automated radiotracer production system will greatly expand the Institute’s multimodal and molecular imaging efforts, and will support many already-funded NIH research projects.

Precision medicine has been an essential goal for many investigators, and the inability to produce cGMP labeled PET imaging probes has been limiting factor in the failure to translate many promising molecular imaging tools into clinical use. The Instutite for Innovation in Imaging was founded in part to meet these needs and bridge the divide between promising preclinical tracer development and advancing human healthcare through advanced imaging tools. Successful translation of several PET imaging tracers at MGH has demonstrated the feasibility and impact of carrying research developments into clinic. These successes have helped create a large demand for radiotracer development and translation using Ga-68 as the positron emitter. We expect the proposed system to enable increased translation of existing imaging projects and enhance future research and development in molecular imaging tools. This new instrument will provide a much-needed resource for investigators already engaged in molecular imaging, and at the same time will offer great opportunities to extend the Institute’s efforts in this emerging field and open new avenues of study that may capitalize on the full spectrum of multimodality imaging resources at the Martinos Center. In addition, the Ga- 68 production system will be an essential piece of equipment for training next generation of scientists, who are preparing for their pursuit of medical imaging training, particularly for molecular imaging training and translational medicine.

The Ga-68 automated radiotracer production system will have a major positive impact on projects across the broad mandate of the NIH in the coming years. We note that in this application, projects that will benefit from the instrument are supported by 5 NIH institutes: NCI, NHLBI, NINDS, NIDDK, and NIA. Thus we expect the benefit of the proposed instrument to be both broad and major.

This instrument will be an important in the New England area, and we anticipate that this will bring new users to our facility. There is no dedicated Ga-68 radiotracer production facility in the greater Boston area, which limits research from utilizing this powerful imaging probe. We note that the core mission of the Institute for Innovation in Imaging is to translate academic imaging technologies and engage users of imaging tracers across both academia and industry.

The required significant institutional commitment and budget needed to create a cGMP production facility limits production of Ga-68 tracers, and other radiotracers, to focused centers that serve the entire research community. Therefore, it is not possible for an individual research group to produce cGMP Ga-68 labeled radiotracers. The strong interest in the capability, among others, instigated the establishment of the Institute for Innovation in Imaging to serve as the resource for Ga-68 radiotracer production for MGH and the greater Boston area – a resource that is not available otherwise.

In conclusion, we believe that acquisition of the proposed Ga-68 automated radiotracer production system will provide means for expanding capabilities in molecular imaging efforts at the MGH and for recruiting young new imaging and radiochemistry scientists to our institution. We also expect that this system will serve as a heavily utilized resource for the Institute for Innovation in Imaging and the larger scientific research community, to provide high-impact and enhanced investigation of a diverse array of disease states.