Written Testimony for the Record
Mitchell Schnall, M.D., Ph.D., President, Academy for Radiology & Biomedical Imaging Research
202-347-5872; Email: mheintz@acadrad.org
1101 Connecticut Avenue NW, Suite 601; Washington D.C. 20036
Subcommittee on Labor, Health and Human Services, Education and Related Agencies
Senate Appropriations Committee
In Support of FY2022 Appropriations for the National Institutes of Health

Madam Chair and members of the Subcommittee, I am Mitchell Schnall, President of the Academy for Radiology & Biomedical Imaging Research (Academy), and the Eugene P. Pendergrass Professor of Radiology and Chair of the Radiology Department at the Perelman School of Medicine at the University of Pennsylvania. The Academy is more than 200 academic research departments, patient advocacy groups, industry partners, and imaging societies that represents thousands of radiologists and researchers in all 50 states. The Academy is the only advocacy organization representing the broad spectrum of the imaging research community by collectively advocating for robust and consistent federal research funding.[1] It is my pleasure to submit this testimony on behalf of the Academy. We strongly support the President's request of $52 billion for the National Institutes of Health and ask that no less than **$46.111 billion of that be for the NIH's base program budget for FY2022**. Investigator-initiated research continues to be the foundation of basic science and discovery. The latter figure represents an increase of $3.177 billion over the FY2021 enacted levels. Moreover, the Academy supports a proportional increase to the National Institute of Biomedical Imaging and Bioengineering (NIBIB), resulting in at least $441.1 million for FY2022—a $30.4 million increase over FY2021. These base increases reflect approximately 5% above the biomedical research and development price index (BRDPI). Through consistent, strong funding for NIH and our national research infrastructure we can continue to make advancements that will improve the lives of patients with a wide spectrum of diseases and disorders. The Academy is grateful for the Subcommittee's past support of NIH and encourages you to continue advancing biomedical research and radiology and imaging science.

Imaging is not limited to any one disease or condition. Instead, it serves as a necessary diagnostic tool that researchers and clinicians of all types use to help advance our understanding of biological systems and how best to develop and deliver treatments benefitting patients. By improving our imaging tools and techniques, we broaden the resources available to address many challenging conditions. In my own work as a clinician-scientist, I use state-of-the-art technologies like specialized magnetic resonance imaging (MRI) and 3-dimensional mammography (digital breast tomosynthesis) to improve the diagnosis and treatment of cancer types, including breast, prostate, and pancreatic, while also researching rare and orphan diseases.

Imaging Innovation to Help Patients

Imaging tools can apply to a wide range of diseases and disorders and can have very real impacts on patient outcomes. This results from Congress's sustained federal investment in biomedical research at NIH over the last several years. Over time, basic science advancements translate into a variety of clinical settings, ultimately benefitting patients. This Subcommittee's

[1] https://www.acadrad.org/about-the-academy/

continued support of NIH, and specifically NIBIB and the other Institutes and Centers that support imaging research, will help generate future breakthroughs across many biomedical challenges. Moreover, these innovations can be translated into the commercial products, supporting the biotechnology industry and jobs. Below are examples of the community's response to the COVID-19 pandemic, advances in detecting and treating cancer, and the role of imaging in detecting and treating neurodegenerative diseases.

Medical Imaging and Data Resource Center: Merging Diagnostics and Machine Learning

In the first of a two-year effort launched in 2020, the goal of the Medical Imaging and Data Resource Center (MIDRC) is "to foster machine learning innovation through data sharing for rapid and flexible collection, analysis, and dissemination of imaging and associated clinical data…in the fight against COVID-19."[2] MIDRC is an NIBIB-funded collaboration between the American College of Radiology (ACR), the Radiological Society of North America (RSNA), the American Association of Physicists in Medicine (AAPM), and the University of Chicago. These partners are building an accessible and shareable database that can be used to accelerate clinical diagnosis, monitoring, and treatment of COVID-19. Datasets are now being released for public use. Moreover, MIDRC is developing machine learning tools for evaluating medical images to determine the likelihood and future severity of infection, as well as the prognosis for recovery. While currently focused on Covid-19, the methods can be applied to any large set of biomedical images to analyze and identify the likelihood of disease or disorder. Leveraging these innovations and computational tools augments human evaluation. This technology, using nationwide data, also improves predictive tools for identifying serious conditions and recovery prognoses while serving as an "early warning" system for future outbreaks.

Combining Diagnostics and Therapy to Treat Cancer

Recent technological advances in imaging have transformed the landscape for detecting and treating many types of cancer. Today, diagnostics and therapeutics can be combined into one action. The evolving field of theranostics—therapy-diagnostics—uses imaging agents, called radiotracers, to simultaneously diagnose and deliver therapy to affected cells. These targeted molecules are engineered to seek out specific types of cancer cells, which may be part of primary tumors or circulating throughout the body as metastases. Imaging for prostate cancer is now 100 times more effective than it was only 15 years ago. And now, these same agents can be loaded with radioisotopes designed to kill cells, becoming "smart bombs" aimed at cancer. Extensive work is underway to develop smart radiotherapy agents for numerous cancers including prostate cancer. Other targeted agents recently approved by the FDA can simultaneously seek out and destroy neuroendocrine cancer cells, a form of pancreatic cancer. These advances are helping physicians become much more effective in diagnosing and treating these and many other types of cancer, including lymphoma and thyroid cancer. Consequently, the patient receives very real benefits—the ability to find and treat cancer in a single action rather than requiring repeated visits, evaluations, and more invasive procedures. Theranostics, built on research funded by multiple institutes at NIH, has the potential to further advance society's goal of making cancer a treatable disease across a broad array of tumor types.

[2] https://www.midrc.org/

Detecting Neurodegeneration to Manage Treatments

Every American knows at least one family with a member afflicted by a neurodegenerative condition such as Alzheimer's disease or another form of dementia. The inexact and sometimes subtle symptoms of these conditions in their early stages, combined with the challenges of studying a living human brain, can make effective diagnoses challenging. Recent breakthroughs in imaging provide alternative, more precise tools physicians can use to diagnose and manage the care of affected patients. New imaging agents allow investigators to detect and quantify amyloid plaques and Tau proteins in the brains of patients—two leading indicators for Alzheimer's disease. This ability informs and accelerates the search for new treatments and methods to predict which patients may benefit from such therapies. In fact, a recent clinical trial investigated a new treatment for the removal of amyloid plaque from patients, an approach enabled by an approved imaging agent supported by an NIH grant.

Treatment of another neurological condition, Parkinson's disease, has also advanced because of emerging imaging research. Patients suffering from essential tremor symptoms, including those with Parkinson's, can now benefit from therapies in which magnetic resonance imaging (MRI) images are used to direct sound waves—High-intensity Focused Ultrasound—in a non-invasive way to alter neuronal connections and activities. This intervention often leads to instantaneous improvement in patient symptoms. While not a cure, alleviation of tremor symptoms allows patients to continue managing their condition by caring for themselves through actions such as dressing, eating, and other activities that require fine motor skills.

Summary and Conclusion

Sustained and robust NIH funding is crucial to advancing our efforts to understand and ultimately treat a myriad of diseases and disorders across human systems. NIH investments are also a key economic driver at local research institutions, and NIH funds flow to every state in the nation.[3] If we are to remain a global leader in biomedical research and innovation, continued, strong support for NIH is essential. Funding NIH's base program with at least $46.111 billion will provide the robust support needed to sustain growth for biomedical research.

Thank you for your strong, continued support of NIH, NIBIB, and all the Institutes and Centers working to advance our biomedical research efforts and to improve the lives of patients worldwide. On behalf of the Academy, I urge you to continue your strong support of our nation's research and innovation enterprise.

[3] https://www.unitedformedicalresearch.org/wp-content/uploads/2021/03/NIHs-Role-in-Sustaining-the-U.S.-Economy-FINAL-3.23.21.pdf