News Releases

MGH and MIT form strategic partnership to address major challenges in clinical medicine

First set of grants support projects designed to improve diagnostic accuracy and cost effectiveness

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A novel partnership between Massachusetts General Hospital (MGH) and Massachusetts Institute of Technology (MIT) is addressing three major challenges in clinical medicine – improving the diagnosis of disease, developing new approaches to prevent and treat infectious and autoimmune diseases, and developing more accurate methods of diagnosing and treating major neurodegenerative and psychiatric diseases. While individual collaborations between MGH and MIT investigators are nothing new, this formalized strategic partnership is designed to accelerate the development of diagnostic tools and therapies.

"MIT and MGH have uniquely synergistic and complementary strengths," says Arup Chakraborty, PhD, director of the MIT Institute for Medical Engineering and Science. "I believe that developing the cost-effective diagnostic tools, therapies and vaccines needed to overcome some of the daunting challenges facing human health today can be achieved by bringing approaches from engineering and basic science together with clinical medicine and that a strategic partnership between our institutions could achieve much more towards advancing human health."

Chakraborty brought his proposal for the creation of such a collaboration to Robert Kingston, PhD, chief of Molecular Biology at MGH, who says, "My initial reaction was that it was a wonderful way to accelerate collaborative work between our institutions. While investigators on both sides of the river have a genuine appreciation for the capabilities found on the other side, formalizing and funding the program will allow many more collaborations to be explored than would be done on an ad hoc basis."

The new partnership will follow the example set by the Ragon Institute of MGH, MIT and Harvard, which was founded in 2009 to find new ways of preventing and curing human disease through harnessing the power of the immune system, with an initial focus on the need for an effective vaccine against AIDS. Over the past five years, MIT engineers and scientists, MGH clinicians and investigators, and collaborators from institutions in the U.S. and around the world have made important progress towards solving one of the greatest scientific and medical challenges of our time.

Under the new partnership, MGH and MIT have committed to providing up to $3 million over a two-year period to fund research projects addressing three Grand Challenges in diagnostics, infectious/autoimmune diseases and neurosciences. Teams applying for the grants must include a principal investigator from each institution, and projects must have the potential to generate results that could lead to further funding from external sources within a year or two. For the first of the challenges, six grants are being funded – two major grants covering two years of funding and four smaller, one-year grants that will be eligible for renewal.

"The continuing crisis in funding for the National Institutes of Health has shifted the NIH focus from single-investigator grants to collaborative grants, encouraging institutions to look outside their walls," says Harry Orf, PhD, MGH senior vice president for Research. "By supporting the early stages of these collaborating teams, we expect to strengthen their ability to apply for continued funding from the NIH or other agencies."

"This strategic alliance amplifies the already substantial capabilities of MIT and MGH," says Ian A. Waitz, PhD. dean of the School of Engineering at MIT. "It builds on our launch of the Institute for Medical Engineering and Science by formalizing a critical element in our effort to advance human health – a direct and sustained connection with a world-class teaching hospital."

Projects addressing the first challenge have the goals of improving the accuracy and cost effectiveness of diagnosis through either the use of real-time monitoring devices or the

analysis of large patient data sets. The first series of grant awards were announced in September and will support these projects:

Larger grants

Michael Cima, PhD, MIT Dept. of Materials Science and Engineering
Herbert Lin, MD, PhD, Division of Nephrology, MGH Dept. of Medicine
Development of a portable, noninvasive device capable of accurately measuring blood volume using nuclear magnetic resonance (NMR).

Anande Dighe, MD, PhD, MGH Dept. of Pathology
Peter Szolovitz, PhD, MIT Computer Science and Artificial Intelligence Laboratory
Use of "machine learning" to analyze changes in a patient's lab test results over time to facilitate early diagnosis or predict the development of clinical problems.

Smaller grants

Matt Bianchi, MD, PhD, Director of Sleep Division, MGH Dept. of Neurology
Dina Katabi, PhD, Director, MIT Center for Wireless Networks and Mobile Computing
Clinical trial of device using wireless signals to monitor breathing without touching a patient's body for improved diagnosis of sleep apnea.

Brian Anthony, PhD, MIT Dept. of Mechanical Engineering
Anthony Samir, MD, MPH, Ultrasound Imaging, MGH Dept. of Radiology
Adaptation of an optical system for localizing the position of ultrasound transducers, which compensates for individual operator differences, to the noninvasive monitoring of tissue loss in chronic kidney disease.

Sangeeta Bhatia, MD, PhD, MIT Institute for Medical Engineering and Science
Raymond Chung, MD, Division of Hepatology, MGH Dept. of Medicine
Evaluation of liver-targeting nanosensors for the noninvasive monitoring of liver damage caused by nonalcoholic fatty liver disease and other disorders.

Michael Filbin, MD, MGH Dept. of Emergency Medicine
Thomas Heldt, PhD, MIT Institute for Medical Engineering and Science

Building an archive of data collected from bedside monitoring and the electronic medical record to develop algorithms predicting the transition from sepsis to septic shock.

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