DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

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Witness appearing before the

Senate Health, Education, Labor, and Pensions Committee

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Mr. Chairman and Members of the Committee:

I am pleased to present this testimony to you for the hearing on Biomedical Innovation. I am Roderic I. Pettigrew, Ph.D., M.D., Director, National Institute of Biomedical Imaging and Bioengineering (NIBIB). We are one of 27 Institutes and Centers at the National Institutes of Health. NIBIB is a relatively new IC. It was created in December 2000 and awarded our first grants in 2002. NIBIB supports more than 800 grants and the work of more than 5,000 researchers, and an Intramural Research Program at NIH. At NIBIB we focus on creating biomedical technologies to improve health.

Our mission is to lead the development and accelerate the application of biomedical technologies to improve health. We are advancing medical care through better understanding, prevention, detection, and treatment of disease. We conduct and support emerging technology research and development that lead to innovative biomedical solutions. Integrating engineering and physical sciences with life sciences by building partnerships with industry, academia, and other Federal agencies is a high priority for the institute. In this testimony I share a few examples from the many exciting NIBIB-funded research efforts, which are leading to practical innovations that advance public health.

Once thought of as an injury with no hope of recovery, a novel therapy that involves electrical stimulation of the spinal cord has restored function to an unprecedented degree in 7 patients treated to date. This is a first-of-its-kind experimental study funded by NIBIB. Following treatment, severely paralyzed patients recovered everyday bodily functions, including bowel, bladder and sexual function. The return of these important basic functions has dramatically improved the quality of life of all who were treated. These patients also regained the ability to voluntarily stand and achieve limited limb movement, providing hope that further recovery may be possible with improvements to this treatment approach. Although this research is still in its infancy and not yet at the clinical trial stage, it has given real hope to people living with paralysis around the world. They have seen the positive impact in the small group of study participants and are eager to have such technologic advances transform their lives as well.

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antigens or drugs to treat a range of cancers or infectious diseases. This research promises a new class of therapeutic agents which harness and enhance the power of our natural defense mechanisms against disease.

intervening in the process. Today, smartphones are natural points of engagement for the large percentage of U.S. adults who own them. Interfacing smartphones with a variety of biosensors may allow the linkage of D Q L Q G LYLGXDO electronic medical records and genomic data with information captured by the smartphone on environmental exposure and behavior if it were done with appropriate security and privacy protections. From measuring secondary smoke exposure to counting steps or testing vision, smartphones can record, track, and transmit a significant amount of health information. Smartphones can also be used as a tool for healthier living. They can be programmed to send automatic reminders to take a medication or an alert when a dose is missed. The overarching potential application relevant to the Precision Medicine Initiative is to link and enrich the genomics and electronic health record data with a broad range of medical exposure and lifestyle information. 7 K L V V H W R I ³ E L J G D W D ´ F D Q E H Q H

completely new way to characterize and understand changes in brain circuit function in mental and neurological disease.

CONCLUSION

NIBIB drives technological innovation to expand biomedical knowledge and create improved diagnostics and therapeutics for this and future generations. By integrating engineering with the physical and life sciences, NIBIB develops practical solutions to complex biomedical problems. These advances are improving human health across the Nation and worldwide.