Brain Gain: Stunning new MRI tech advances neuro research and clinical translation capabilities at #ISMRM20

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Waukesha, WI – August 10, 2020 – At this year's virtual ISMRM meeting, GE Healthcare is showcasing new technologies to enable neuro research to better understand Alzheimer's disease and traumatic brain injury, as well as accelerate clinical translation. The 510(k)-pending SIGNA 7.0T [1], as well as research devices SIGNA ultra-high performance (UHP) 3.0T and the head-only MAGNUS gradients [2], represent GE Healthcare's continued dedication to advancing neurological research and clinical translation with leading institutions around the world

Example of high-res functional MRI imaging. Left: quantified changes in brain...
PICTURE CREDIT: Sample images obtained on SIGNA 7.0T system. 510(k) pending at FDA. Not available for sale.
IMAGE/PNG · 0.4 MB

Sample images obtained on MAGNUS gradient coil.
PICTURE CREDIT: Sample images obtained on research device limited by U.S. law to investigational use.
IMAGE/PNG · 2.37 MB

0.5mm isotropic anatomical (left) & corresponding 1.5 mm isotropic diffusion...
PICTURE CREDIT: Sample images obtained on research device limited by U.S. law to investigational use.
IMAGE/PNG · 2.24 MB

SIGNA 7.0T
IMAGE/JPEG · 3.62 MB

SIGNA 7.0T is designed to overcome the limitations of the majority of today's clinical MRI systems by leveraging the ultra-high field magnet technology within its core. With approximately five times more power that most clinical systems, SIGNA 7.0T is designed to detect subtle structures that may be significant for clinicians and researchers alike. This new 60-centimeter bore system is designed to be a more powerful tool to image neurodegenerative diseases as well as extremities. SIGNA 7.0T features UltraG gradient technology, GE's most powerful, whole-body gradient coil, designed to meet the needs of ultra-high field imaging speed and resolution. This system features the familiarity of SIGNAWorks applications platform so clinicians can use the latest state-of-the-art applications such as deep learning-based platform tools like AIR x brain for automated slice positioning and Silent MR imaging. In addition, SIGNA 7.0T will be equipped with Precision RF transmit and receive architecture designed to enable improved image quality and research flexibility.

> **"The integration of the new MR platform into SIGNA 7.0T system has resulted in outstanding image quality," said Garry Gold, professor of radiology at Stanford University. "Stanford has been working with GE at the 7.0T field strength for over 15 years and we expect this new platform to be transformative for the next generation of scientists, researchers and clinicians."**

SIGNA UHP 3.0T is an investigational device configuration that delivers improved visualization of microstructure changes that may arise in disorders such as Alzheimer's and Parkinson's disease. The research gains that SIGNA UHP 3T provides are a result of significant design improvement incorporated into the UltraG gradient technology, the RF architecture, and the SIGNAWorks features. SIGNA UHP 3.0T benefits from sharing many of the same high-performance components as the 510(k)-pending SIGNA 7.0T but at the lower field strength, thus enabling more research sites to access this advanced technology at lower cost. As a whole-body 3T system, SIGNA UHP 3.0T can be used to scan all clinical anatomies.

> **"[SIGNA] UHP 3.0T is an advanced platform that allows us to develop tools to investigate brain microstructure changes and improve our understanding of disease mechanisms," said Allen Song, professor and director, Brain Imaging and Analysis at Duke University. "And more importantly, [SIGNA UHP 3.0T enables us to] better plan new treatment options for neurodegenerative diseases."**

MAGNUS: GE Research Center, together with Uniformed Services University (USU), the U.S. government's health sciences university, have kicked off a new study funded by the US Department of Defense that could lead to new imaging biomarkers for diagnosing cases of mild TBI. The study will involve testing military personnel suffering from acute and chronic mild TBI on GE's experimental high-performance **M**icrostructure **A**natomy **G**radient for **N**euroimaging with **U**ltrafast **S**canning (MAGNUS) gradient coil installed at a major U.S. military treatment facility.

The head-only MAGNUS MRI system is designed to help researchers image subtle neuro microstructures and changes caused by mild TBI that conventional MRI systems cannot achieve. This new high-performance brain imaging platform could help establish first objective measures for diagnosing mild cases of mild TBI, and potentially other neurodegenerative diseases such as Alzheimer's disease, Post Traumatic Stress Disorder (PTSD), Attention Deficit Disorder (ADD), and mild cognitive impairment. MAGNUS is designed to deliver an unprecedented combination of gradient strength and slew rate for brain imaging, operating in the 500 – 700 Tesla/meter/second (T/m/s) and 200-300 milliTesla/meter (mT/m) range vs. up to 200 T/m/s and 50-80 mT/m in conventional MRI scanners.

“We are thrilled to showcase our latest advanced neuro imaging offerings to both researchers and clinicians,” said Jie Xue, president and CEO of GE Healthcare MR. “Technologies like SIGNA 7.0T, SIGNA UHP 3T and the head-only MAGNUS gradient coils are critical tools to help advance our understanding of diseases like Alzheimer’s and mild TBI and continue to develop new diagnostic tools and potential treatment options.”

[1] SIGNA 7.0T is 510(k) pending at the U.S. FDA and not available for sale.

[2] MAGNUS MRI system and SIGNA UHP are investigational devices limited by U.S. law to investigational use.