AI-Based Blood Test Predicts NEURODEGENERATIVE DISEASE PROGRESSION

▶ *Trend Watch: AI continues to enhance testing, prediction, and diagnosis*

A new study illustrates that analysis of blood samples through the use of artificial intelligence can be used to predict disease progression.

Researchers at The Neuro (Montreal Neurological Institute and Hospital) of McGill University and the Ludmer Centre for Neuroinformatics and Mental Health used an AI algorithm to analyze the blood and post-mortem brain samples of patients with Alzheimer's and Huntington's diseases. The goal of the research was to find molecular patterns specific to these diseases, driven in part by the lack of longitudinal gene expression data that is available.

By evaluating 1,969 subjects in the spectrum of late-onset Alzheimer's and Huntington's diseases, the researchers developed a novel method that reveals gene expression patterns in the diseased population. They write that the unsupervised machine learning algorithm "strongly predicted neuropathological severity."

The work shows that the algorithm was able to detect how the patients' gene expression pattern changed over decades, offering the first long-term view of molecular changes underlying neurodegeneration.

When AI was applied to in vivo blood samples at baseline, the authors noted, "it significantly predicted clinical deterioration and conversion to advanced disease stages, supporting the identification of a minimally invasive (blood-based) tool for early clinical screening."

The technique allows the discovery of genes and molecular pathways, in both peripheral and brain tissues, which are highly predictive of disease evolution.

The AI is a promising tool for revealing complex neuropathological mechanisms, with direct implications for implementing personalized dynamic treatments in neurology.

The authors noted that "85% to 90% of the most predictive molecular pathways identified in the brain are also top predictors in the blood. These pathways support the importance of studying the peripheral-brain axis, providing further evidence for a key role of vascular structure/functioning and immune system response."

According to researchers, the next steps will be testing these models in other diseases such as Parkinson's disease and amyotrophic lateral sclerosis.

The work is published in a paper titled, "Blood and Brain Gene Expression Trajectories Mirror Neuropathology and Clinical Deterioration in Neurodegeneration" published in Brain.

AI Powers Personalized Medicine Approach to DETECTING HYPOGLYCEMIA

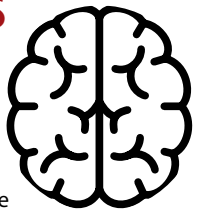
Researchers at the University of Warwick in the UK have shown that they can detect dangerous hypoglycemic events with an accuracy of 82% by simply analyzing ECG graphs generated by a commercially available wearable device, such as Medtronic's Zephyr BioPatch HP. This is comparable with the current capabilities of invasive continuous glucometers.

If these results are confirmed in more extensive research studies, the technology may help with pediatric patients, aid in preventing hypoglycemia during sleep, and lead to a major improvement in the quality of life for many patients who have diabetes.

""Fingerpricks are never pleasant and in some circumstances are particularly cumbersome," says Dr Leandro Pecchia from the School of Engineering at the University of Warwick. "Taking fingerpricks during the night is unpleasant, especially for patients in pediatric age. Our innovation uses AI to automatically detect hypoglycaemia via a few ECG beats. This is relevant because ECG can be detected in any circumstance, including sleeping."

The ECG signals of each patient are recorded and hypoglycemic events noted using traditional means. Given enough data, the Warwick system notices the ECG signal biomarkers that come up in cases of hypoglycemia, which it can spot during subsequent analysis.

Tumor Tissue Imaging and AI Bypass Path Lab FOR BRAIN SURGERIES



In a major development in how tumors are excised, researchers at the University of Michigan have shown that it's possible to accurately analyze brain tumor tissue within the operating room and assess its nature using artificial intelligence.

The new technology comes in the form of the NIO Imaging System from Invenio, a company out of Santa Clara, Calif.

Using stimulated Raman histology, developed at the University of Michigan, the AI system is able to quickly image tissues at the microscopic scale without any staining, completely bypassing the pathology lab.

The technology is so fast that surgeons can take follow-up actions that may prevent the tumor from regrowing without having to schedule another costly procedure.

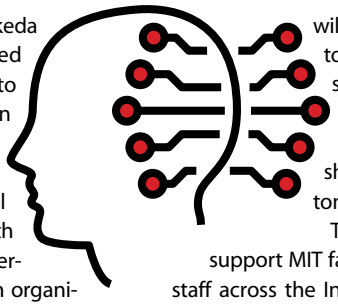
The imaging system was augmented by AI software that was taught to learn what various types of brain tumors look like. This involved feeding a convolutional neural network powering the software with more than 2.5 million tissue sample images from 415 patients.

The system has been found to be impressively accurate and provides a quick prediction of the type of tissue being evaluated.

Used on 278 patients undergoing brain surgery, the new method had a diagnostic accuracy slightly better than conventional histology (94.6% vs 93.9% respectively).

"This is the first prospective trial evaluating the use of artificial intelligence in the operating room," says Todd Hollon, M.D., lead author of the study appearing in Nature Medicine. "We have executed clinical translation of an AI-based workflow. It's so quick that we can image many specimens right by the patient's bedside and better judge how successful we've been at removing the tumor. The surgeon and pathologist determine whether they can make the diagnosis using the SRH image, or whether there is a need to send additional tissue to the pathology lab, the way we used to in the past."

MIT School of Engineering and Takeda Join to ADVANCE RESEARCH IN AI AND HEALTH

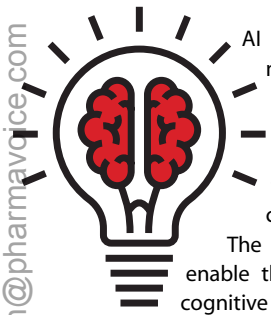


MIT's School of Engineering and Takeda Pharmaceuticals Company Limited unveiled the MIT-Takeda Program to fuel the development and application of AI capabilities to benefit human health and drug development. Centered within the Abdul Latif Jameel Clinic for Machine Learning in Health (J-Clinic), the new program will leverage the combined expertise of both organizations and is supported by Takeda's three-year investment — with the potential for a two-year extension.

This new collaboration provides MIT with extraordinary access to pharmaceutical infrastructure and expertise and will help to focus work on challenges with lasting, practical impact. A new educational program offered through J-Clinic will provide Takeda with the ability to learn from and engage with some of MIT's sharpest and most curious minds and offer insight into the advances that will help shape the health care industry of tomorrow.

The MIT-Takeda Program will support MIT faculty, students, researchers, and staff across the Institute who are working at the intersection of AI and human health, ensuring that they can devote their energies to expanding the limits of knowledge and imagination. The new program will coalesce disparate disciplines, merge theory and practical implementation, combine algorithm and hardware innovations, and create multidimensional collaborations between academia and industry.

AI Company MyndYou PARTNERS WITH ALLSCRIPTS



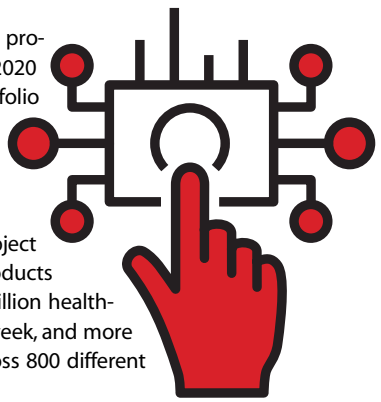
AI company MyndYou Partners has made its triaging and care management solution available to electronic health record technology firm Allscripts' clients.

The partnership is intended to enable the passive monitoring of cognitive change, which will help identify patients' real-time health risks in their home to allow early intervention and prevent hospitalization.

MyndYou's cognitive-driven AI-based triaging and case management platform, Cognitive Complexity Analysis, allows healthcare providers to remotely engage and intervene with high-risk patients in their homes using passively collected voice and daily-activity data. Cognitive Complexity Analysis detects subtle changes in cognitive and behavioral function and elevates the information within a clinic's care management workflow to maximize the chance of early intervention.

The MyndYou app works by detecting subtle changes in behavioral function, such as when walking, driving, and sleeping, which could signal a heightened risk of hospitalization or deterioration. The firm also provides an automated, personalized voice bot named Eleanor, which can directly call the patient's phone using targeted questionnaires to retrieve important information regarding their health and safety. Integrated analyses of data from both of these channels can be accessed in a care portal for clinicians.

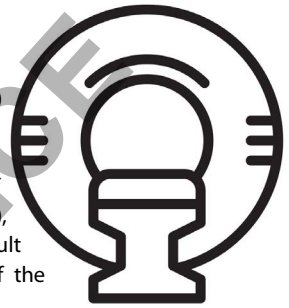
H1 Joins Y Combinator, OPENS SAN FRANCISCO OFFICE



H1, a New York-based healthcare AI data-driven solutions provider, has been accepted to Y Combinator's (YC's) Winter 2020 batch of portfolio companies. H1 joins the ranks of YC's portfolio of companies, including Airbnb, Dropbox, Stripe, Reddit, Doordash, Coinbase, Twitch and others. The announcement came at the same time that H1 opened its first San Francisco location.

H1's product suite uses the latest in data science and subject matter experts to produce proprietary data intelligence products for healthcare and life sciences companies. More than 8 million healthcare professional (HCP) profiles are kept up to date every week, and more than 16,000 institutions are profiled. There is coverage across 800 different specialties and the most prevalent therapeutic indications.

Aidoc Earns Fourth FDA Clearance FOR RADIOLOGY AI



The FDA has granted 501(k) clearance to radiology company Aidoc's AI-based system for the detection of large-vessel occlusion (LVO), ischemic strokes that result from a blockage in one of the major arteries of the brain.

The clearance marks the company's fourth FDA-approved AI package and its second for stroke, having previously received clearance for an AI module that flags and prioritizes intracranial hemorrhage.

Aidoc's solution continuously scans images for both ischemic and hemorrhagic stroke, automatically moving suspected cases to the top of radiologists' worklists. Aidoc's integrated solution provides a single context for radiologists to diagnose both LVO and hemorrhage, so they can quickly decide on the most appropriate course of action. Often, patients are diagnosed with stroke in a smaller facility before being moved to a specialist stroke center for treatment. Aidoc's combined stroke solution ensures that the diagnosing facility and the stroke center can work together in a coordinated manner to expedite patient care.

First AI-Generated Drug ENTERS CLINICAL TRIALS

The first AI-created drug, DSP-1181, will soon enter clinical trials. British start-up Exscientia and Japanese pharmaceutical firm Sumitomo Dainippon Pharma have turned development on its head by leveraging AI to reduce the timeline to less than one year.

DSP-1181, a long-acting, potent serotonin 5-HT1A receptor agonist, is intended for the treatment of OCD. In Japan, approximately 1 million people suffer from OCD, while the disorder affects 3 million people in the United States.

During development, Exscientia applied its Centaur Chemist Artificial Intelligence platform, which has generated nearly 100 billion novel compounds through evolutionary design. DSP-1181 was created using algorithms that sifted through potential compounds, checking them against a huge database of parameters.

"We believe that this entry of DSP-1181, created using AI, into clinical studies is a key milestone in drug discovery," says Andrew Hopkins, CEO of Exscientia.