

Learning about human illness doesn't require animals

From CAARE Citizens for Alternatives to Animal Research

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For decades animals have been used in learning experiments. Typically these involve a chamber that trains mice, rats or pigeons to press a lever and receive either a reward like a sip of fluid or a punishment, like a shock. But we don't need animals to study learning and in fact, these artificially constructed environments shed little light on human learning. The first article describes how scientists used non-invasive EEG to impact the learning process in human volunteers.

Another common area of animal experiments involves studying human smoking and tobacco use. Incredibly these experiments still continue, even though it's widely known that smoking is harmful. Scientists are still subjecting animals to smoke and nicotine, claiming to understand how we can help smokers quit. The second article describes an experiment that uses machine learning to discover existing medications that may help.

The articles we highlight each week are not necessarily endorsed by CAARE as examples of outstanding research, although some are, but they are posted here to demonstrate how we don't need to torment animals to study these topics, and in fact, animal research will always be fundamentally flawed when applied to the human system.

Tuning into brainwave rhythms speeds up learning in adults, study finds



Scientists at the University of Cambridge used [human-relevant technology to study the learning process in humans](#), rather than experiment on animals that do not accurately mimic human physiology.

Eighty participants underwent electroencephalography (EGG) scans that measured their alpha wave rhythms. They then received pulses before doing a cognitive task. Participants that received a pulse at a rhythm that matched their own brainwaves learned a task three times faster than other participants who received either random or unmatched pulse waves.

The results suggest that optimizing information delivery to match brainwaves could improve learning, which may have implications for child development and learning.

Machine learning identifies drugs that could potentially help smokers quit



Repurposing already approved drugs can save time, money, and resources, as well as reduce animal testing. A [new study](#) from researchers at Penn State found that some medicines, including a cough medicine called dextromethorphan, may help smokers quit.

Researchers used machine learning to analyze genetic data and self-reported smoking behavior from over 1.3 million people. They found more than 400 genes that were connected to smoking behavior, many of which were related to dopamine signaling. For other genes, they detected which biological pathways were affected, and figured out which existing therapeutics could be repurposed to help smokers quit.

Studies like this are immensely more relevant and humane than confining animals into chambers or attached to tubes that force them to inhale tobacco fumes.

Predicting two common heart conditions



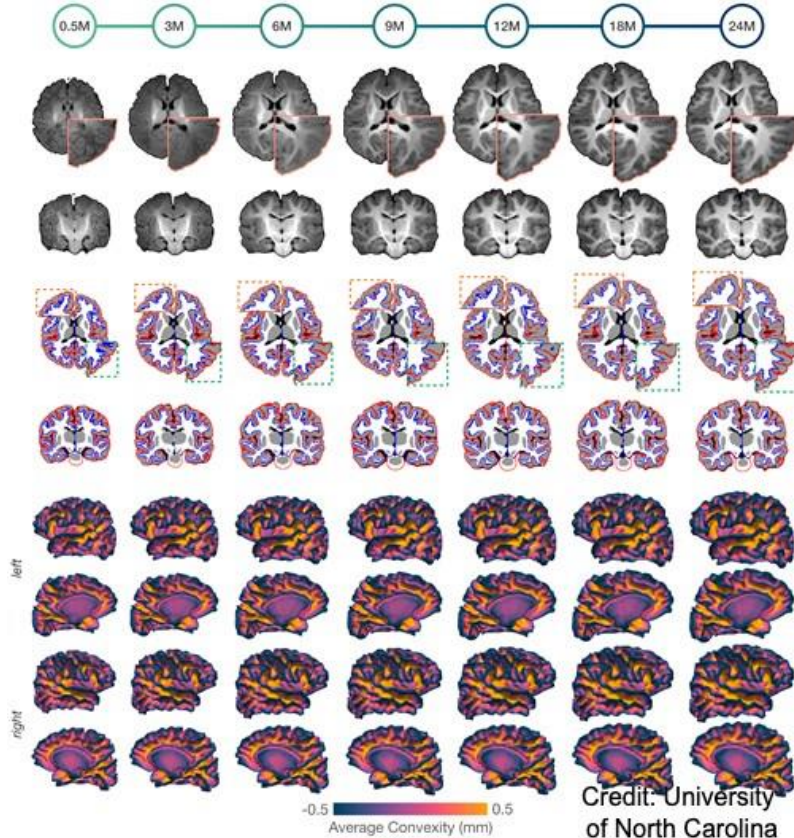
Researchers from Cedars-Sinai are [advancing the ability to predict - and therefore better treat - two common heart conditions.](#)

In the first study, scientists analyzed blood biomarkers from human participants and identified 26 that were associated with sudden cardiac arrest.

In another study, researchers trained an artificial intelligence tool to predict coronary artery calcium levels after programming it with data from almost 3,000 echocardiograms. The platform was able to accurately predict which patients had a higher risk of heart attack and coronary artery disease.

These insights were possible through the use of novel, human-based technology instead of relying on outdated and cruel animal testing.

New collection of human brain atlases that chart postnatal development

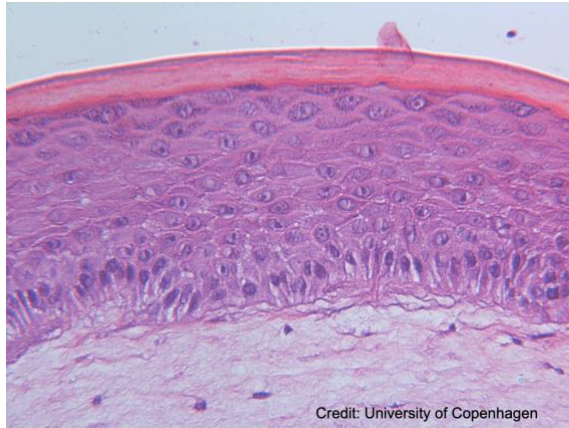


Researchers at the University of North Carolina School of Medicine have developed [an infant brain atlas](#) (IBA) that can help scientists learn more about neurodevelopment.

The atlas tracks infant development from 2 weeks to 2 years of age across both space and time, showing the tissue contrast, volume, and microstructural characteristics each month. This human-relevant resource will better enable scientists to spot abnormal development in children, including attention-deficit/hyperactivity disorder (ADHD), dyslexia, and cerebral palsy.

Additionally, scientists believe the atlas can accelerate the discovery of new insights into infant neurodevelopment and potential treatments.

Artificial human skin paves the way to new skin cancer therapy



A major difficulty in studying skin cancer has been the lack of a human-relevant model. Now, researchers at the University of Copenhagen have developed [artificial human skin](#) and found that several drugs can inhibit the invasive growth of skin cancer.

By culturing genetically manipulated human skin cells on subcutaneous tissue made of collagen, skin cells were developed that resemble real human skin. Researchers focused on the THF beta pathway and tested various already existing drugs that show great promise in blocking these signaling pathways.

Dr. Hans Wandall confirms that testing these therapeutics on artificial human skin verifies their safety. He states, “By using artificial human skin we are past the potentially problematic obstacle of whether results from tests on mice models can be transferred to human tissue. Previously, we used mice models in most studies of this kind. Instead, we can now conclude that these substances probably are not harmful and could work in practice, because the artificial skin means that we are closer to human reality”.