MEDPULSE

Improved cellular recycling could benefit patients with neurodegenerative conditions
CANADA | January 2024

Researchers at SickKids Hospital are discovering new ways to treat neurodegenerative conditions. Zellweger Spectrum Disorders (ZSDs) are a set of rare inherited neurodegenerative diseases characterized by dysfunctional peroxisomes: organelles commonly used in lipid metabolism.[1,2] Pexophagy, the autophagic degradation of peroxisomes, was analysed to model similar selective autophagy pathways.[2] When pexophagy was upregulated, they showed that similar 'recycling pathways' could not effectively break down other cellular waste.[2] Their findings extended to in vivo cell models of ZSD and other neurodegenerative conditions, like Parkinson's Disease and Huntington's Disease.[2] Hence, therapeutically enabling a cell to better recycle its own components could reduce the accumulation of damaged cellular material.[2,3]

The Sun Sets Sail, 2001
(Canada)

First heart valve transplants that grow with the child
UNITED STATES OF AMERICA | January 2024

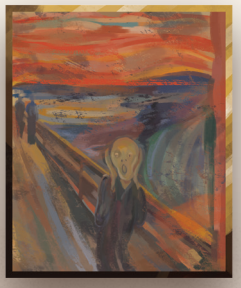
North Carolina's Duke University is now home to the first ever heart valve transplant that has grown with its neonate recipient for one year.[4] Dr. Joseph Turek sought to address the issue of recurrent implant exchanges for children born with irreparable heart valve dysfunction as their heart grows with age.[5] A partial heart transplant from a neonate donor provides the ideal treatment since the patient now requires fewer immunosuppressants and further surgical intervention is minimized.[6] This operation opens the door to more life-saving partial heart transplants, tissue engineering of heart valves, and the potential for domino transplants where a single heart can save multiple patients.[7]

American Gothic, 1930
(United States of America)

Chikungunya vaccination could help millions in South America
BRAZIL | November 2023

Originating from Tanzania in 1953, mosquito-borne chikungunya virus—"disease that bends up the joints" in Swahili—is characterised by severe joint pain.[8] This tropical disease has spread across Africa, Asia and, notably, South America, which faces an ongoing epidemic with an estimated total of 3.7 million cases.[9] Good news comes in the form of the first FDA-approved chikungunya vaccine, called Ixchiq, developed by Valneva.[10] Clinical trials have shown that 99% of people develop long lasting antibodies after a single shot.[11] Discussion around vaccine rollout, prioritising South Americans or tourists, is ongoing.[11]

Porto I, 1953
(Brazil)



The Scream, 1893
(Norway)

References can be found on our website: www.themeducator.org

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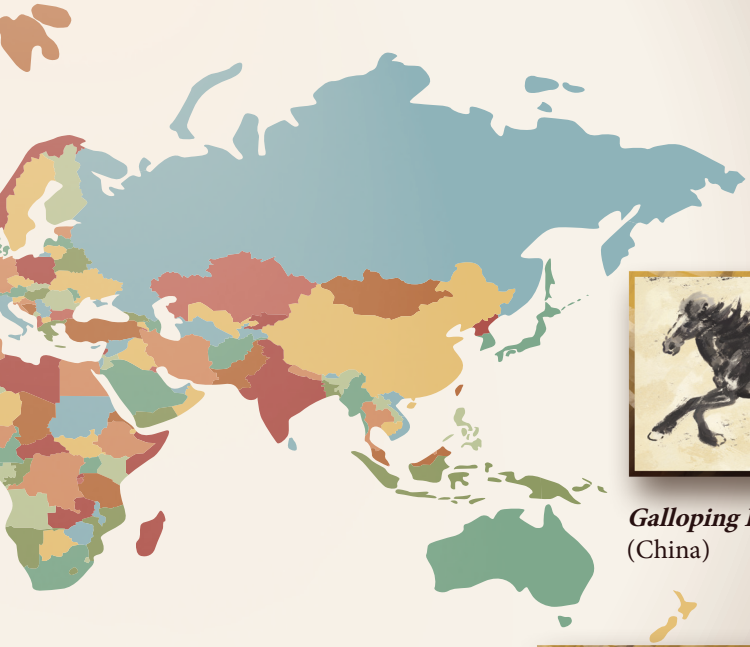
The Fighting Temeraire, 1838 (England)

Whole-genome sequencing reveals cancer treatment benefits
ENGLAND | January 2024

A groundbreaking study led by Genomics England has shown that whole-genome sequencing (WGS) could be the key to more precise and personalised cancer treatments.[12] The Cancer Programme of the 100,000 Genomes Project, initially announced in 2012, analysed WGS data from 13,880 solid tumours across 33 types of cancers.[12,13] From this data, researchers found that over 90% of tumours in the brain, and over 50% in the lungs or colon, exhibited genetic alterations that would impact patient treatment.[14] Furthermore, 13% of 1,617 sequenced sarcomas expressed large structural variants.[12] These discoveries help highlight precision oncology as a promising avenue for cancer treatment.



Galloping Horse, 1953 (China)

Prostaglandin degradation enzyme found to be potential therapeutic target for ischemic stroke
CHINA | January 2024

Researchers in China are paving the way for a new treatment for ischaemic stroke. Where standard treatments seek to catalyze plasminogen into plasmin to dissolve blood clots, this research targets an enzyme responsible for the degradation of a prostaglandin.[15,16] 15-Hydroxyprostaglandin dehydrogenase (15-PGDH) is the degrading enzyme of prostaglandin E2 (PGE2), which has been shown to be important for the control of regulated cell death.[16] When inhibited, new research shows the activated PGE2/EP4 axis transcriptionally upregulates vGPX4, a protein responsible for regulating cell death through ferroptosis.[16,17] Therefore, inhibition of 15-PGDH alleviates ischemic stroke and, consequently, presents a promising therapeutic target for the near future.[16]

Untitled, 1999 (Uganda)

Ordered brain activity found in mice
NORWAY | December 2023

Dr. Soledad Gonzalo Cogno is spearheading a team to study how the brain handles memory.[18] Based out of Norway's NTNU Kavli Institute for Systems Neuroscience, Dr. Cogno's team investigated the way the brain categorises experiences in chronological order to form sequences for memory.[19] Analysis of ultraslow oscillatory sequences in the medial entorhinal cortex in mice identified unique new sequence formation during navigation and episodic memory formation.[18] This discovery of novel brain patterns has implications in the neuroscience of memory, learning, and spatial navigation.

Novel model for rheumatic heart disease treatment
UGANDA | January 2024

Rheumatic heart disease (RHD), a condition caused by chronic heart valve damage following rheumatic fever, is the leading cause of heart disease for youth in Uganda.[20] To streamline RHD screening and recurrent antibiotic admission, the Ugandan Ministry of Health is advancing the "Accelerating Delivery of Rheumatic Heart Disease Preventive Interventions in Uganda" trial.[21] It offers free RHD screening in schools, health centres, and community events from nurses and clinical officers who received training from experts at the Uganda Heart Institute.[21] To improve secondary treatment times, Uganda moved their existing RHD registry from a centralised location to the cloud.[21] Uganda's exemplary work sets effective standards for global RHD treatment and situational public health action.