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MEDi: An Interactive Robotic System for Pediatric Pain Management CANADA | October 2025

Dr. Jennifer Stinson, a senior scientist at the Hospital for Sick Children, is integrating technology to reduce anxiety and discomfort for children during medical care. Medicine and Engineering Designing Intelligence (MEDi) is a novel half-meter-tall robot that engages patients through stories, music, games, and even guided breathing exercises. MEDi was designed based on the clinical needs of Dr. Stinson's patients, and her team's clinical studies suggest that interactions with MEDi lead to significant reductions in pain levels. Dr. Stinson is working on expanding MEDi's capabilities by using artificial intelligences othat the robot can actively respond to children's emotional cues in real-time. MEDi, alongside Dr. Stinson's other tools, can

improve the quality of care for children experiencing pain and illness.1

Lipid Injections as a Treatment for Vision Degradation UNITED STATES OF AMERICA | October 2025

The enzyme, elongation of very-long-chain fatty acids protein 2 (ELOVL2), is an aging biomarker.³ ELOVL2 increases levels of omega-3-fatty acid docosahexaenoic acid (DHA) and very-long-chain polyunsaturated fatty acids (VLC-PUFAs) in the eye, subsequently improving vision.^{3,4} A study explored a method to achieve similar effects without the ELOVL2 enzyme.⁴ Older mice were injected with VLC-PUFA, which improved agerelated macular degeneration (AMD) and reversed signs of molecular aging.⁴ Within 120 minutes, the injected VLC-PUFA accumulated in the retinal pigment epithelium, a crucial component of vision.⁴ However, injected DHA had less improvement for AMD, challenging the ability of DHA to slow AMD progression.⁴ Hence, for individuals with ELOVL2 mutations linked to increased progression of AMD, lipid injections prove to be an effective treatment.⁴ Further trials and experimentation on the etiology of fatty acid-related improvements in vision are currently being explored.

Long-term Exercise Enhances Natural Killer Cells in the Immune System BRAZIL I October 2025

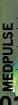
Exercise is a known contributor to physiological and psychological well-being, playing a crucial role in cardiovascular, respiratory, and mental health.⁵ A study demonstrated the potential of long-term exercise in improving the immune system by assessing natural killer (NK) cell function, a key player in the body's immune defenses.⁶ Researchers divided participants into two study groups based on long-term exercise history: one untrained group and one endurance trained group.⁶ In participants who underwent consistent long-term exercise, their NK cells demonstrated stronger effector responses, greater metabolic resilience, and reduced markers for immune cell aging than the untrained group.⁶ Researchers also exposed

NK cells from both the trained and untrained group to propranolol and rapamycin, medications that limit adrenaline production and cell growth, respectively.⁶ In the exercise group, NK cells maintained their immune functions despite the strain on signaling pathways.^{6,7} The study shows that long-term exercise improves flexibility and









Non-Invasive Ultrasound Helmet for Targeted Neuromodulation in Neurological Disorders

UNITED KINGDOM | September 2025

A non-invasive ultrasound helmet has emerged as a potential targeted treatment for neurological disorders such as Parkinson's disease.¹⁷ Researchers from University College London and Oxford University developed a helmet to advance transcranial ultrasound stimulation by focusing ultrasound beams on specific brain areas like the substantia nigra, a region affected in Parkinson's disease.¹⁷ In a recent study, stimulation of the lateral geniculate nucleus—a key relay in visual processing—was observed using a functional MRI (fMRI). A fMRI is a non-invasive technique that detects brain activity through changes in blood flow.¹⁸ With stimulation, fMRI activity in the visual cortex increased, meaning the helmet successfully activated the targeted brain region.¹⁸ Following stimulation, activity in the same region decreased for around 40 minutes, suggesting the helmet can both excite and suppress brain activity depending on stimulation parameters.¹⁸ These results suggest that the helmet could modulate neuronal activity to potentially treat symptoms of neuronal

Low-Dose Radiation Treatment for Osteoarthritis SOUTH KOREA | October 2025

Osteoarthritis is the most common type of arthritis, impacting 3.9 million Canadians and results in degradation of the cartilage in common joints.12 Researchers discovered that low-dose radiation therapy can relieve knee pain in patients with mild to moderate osteoarthritis.13,14 In a recent study, 114 participants across three hospitals were randomly assigned to three radiation therapy groups: very low-dose, low-dose, and placebo.14 Each group underwent six rounds of their respective treatments without additional medication. In the low dose group, 70% of participants reported an improvement in two out of three measures (pain, physical function, and condition assessment) compared to 42% in the placebo group.14 This treatment is preventative and cannot regenerate tissue, so it is best suited for those with mild and moderate symptoms.14 The study is ongoing and will observe participants after a 12-month

Paxalisib: A Novel Drug for High-Grade Gliomas in Clinical Development AUSTRALIA | September 2025

Researchers from the University of Newcastle have recently received an \$18.7 million grant from the Australian Government's Medical Research Future Fund to support the development of new therapies for high-grade gliomas (HGGs). HGGs are among the deadliest malignancies due to their rapid growth and infiltration of brain tissue. Clinicians have developed a drug, paxalisib, that when combined with radiotherapy, can extend survival in preclinical models by 150%. Paxalisib is an oral inhibitor that penetrates the blood brain barrier to suppress a frequently activated signalling pathway involved in tumour growth and survival. Supported by new funding to initiate clinical trials within five years, this therapy demonstrates strong potential for treating HGG in the future.

Safety of a Two-dose Ebola Vaccine Regimen During Pregnancy In Rwanda RWANDA I September 2025

Ebola virus disease poses an extremely high risk to pregnant women and fetuses, with fatality rates ranging from 53-89%. Although the two-dose heterologous regimen is approved under emergency use in Rwanda for non-pregnant individuals, maternal and fetal risks were unknown. A study randomized pregnant women 18 years or older in Rwanda to receive the vaccine during pregnancy or to delay vaccination until after pregnancy. Infants were monitored for 14 weeks post-delivery and the vaccine regimen was well tolerated. Maternal antibody responses persisted in cord blood and infant serum at 14 weeks, suggesting evidence of passive transfer; however, protective efficacy against Ebola was not measured. Future studies are needed to evaluate protective effectiveness and to optimize vaccination strategies during pregnancy.