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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.¹ 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.² 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.² Dr. Stinson is working on expanding MEDi's capabilities by using artificial intelligenceso that the robot can actively respond to children's emotional cues in real-time.² 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 age-related 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 | 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).¹⁰ HGGs are among the deadliest malignancies due to their rapid growth and infiltration of brain tissue.¹⁰ Clinicians have developed a drug, paxalisib, that when combined with radiotherapy, can extend survival in preclinical models by 150%.¹⁰ Paxalisib is an oral inhibitor that penetrates the blood brain barrier to suppress a frequently activated signalling pathway involved in tumour growth and survival.¹¹ Supported by new funding to initiate clinical trials within five years, this therapy demonstrates strong potential for treating HGG in the future.¹¹



Safety of a Two-dose Ebola Vaccine Regimen During Pregnancy In Rwanda

RWANDA | September 2025

Ebola virus disease poses an extremely high risk to pregnant women and fetuses, with fatality rates ranging from 53-89%.⁸ Although the two-dose heterologous regimen is approved under emergency use in Rwanda for non-pregnant individuals, maternal and fetal risks were unknown.⁹ A study randomized pregnant women 18 years or older in Rwanda to receive the vaccine during pregnancy or to delay vaccination until after pregnancy.⁹ Infants were monitored for 14 weeks post-delivery and the vaccine regimen was well tolerated.⁹ 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.⁹ Future studies are needed to evaluate protective effectiveness and to optimize vaccination strategies during pregnancy.⁸

