

MEDIC FOUNDATION

JANUARY 2024



M.E.D.I.C.
TECHNOLOGY | CULTURE | HEALTHCARE

SNEAK PEEK INTO THE LAB

LOW-COST DIABETES MEDICAL TECHNOLOGY

Our Diabetes team has moved into the second phase of the project, with the goal of developing a non-invasive and continuous monitoring system to detect early diabetic ketoacidosis (DKA). The team is working on compiling a scope review to highlight the lack of existing research in biomarkers which can be used for early DKA diagnosis.

GALVANIC VESTIBULAR TECHNOLOGY

GVS is a non-invasive brain stimulation technique that affects the firing of the vestibular system by conducting an electrical current to the mastoid process behind the ears through electrodes (2-pole system). The research has since evolved into a 3-pole system and our team aims to determine if 3-pole GVS induces improvement in motor performance when compared to 2-pole GVS.

MULTIMODAL CANCER PROFILER PRECISION MEDICINE

Our Cancer Research Team (CREPE) is contributing to work that attempts to identify biological patterns within cancer patients of various types. The team is progressing a software pipeline that works with pathological image representations from different types of cancer, which supports future analysis of the images to discover underlying patterns.

IBD/CROHN'S MONITOR PREDICTION SYSTEM

Our Crohn's and IBD Team is hard at work to begin research on potential biomarker targets. The team is in the process of assessing past successful IBD/Crohn's treatments and determining whether improvements can be made on recent technology. Our team is looking for financial support and sponsorship. If you are interested in working with us, please reach out on our website!

FUTURE EVENTS

Hiring is back on! If you are looking to be involved in a team who are passionate about healthcare and novel innovation for the betterment of the community, MEDIC is the place to be. We are currently hiring for three positions:

Care Companion Volunteers are responsible for providing comfort and companionship for seniors. They foster an environment of trust and open communication for innovation.

Care Companion Coordinators will oversee the volunteer and senior sessions at designated senior homes. They are responsible for providing feedback and guidance to volunteers.

Finance and Grants Analyst is responsible for assisting the financial team in identifying applicable financial resources and support. They will also aid with cash flow and financial policies within MEDIC.

Other upcoming events include our E-Merge workshops, a STEM experience for high-school students. Led by incredible members of our MEDIC team, students can expect an innovative afternoon filled with learning and creativity. This is a great opportunity to spark an interest in science amongst youth.

JOIN THE MEDIC TEAM!

Applications open: January 2nd

Applications close: January 17th

Details regarding hiring, positions, skills and requirements, and time commitment can be found below:





CR: CANVA

THYROID CANCER: CLINICAL DRUG RESEARCH TESTING

By: Simone Abraham

For several years, the targeted drug selpercatinib (Retevmo) has been a treatment option for people with lung or thyroid cancer cases where the tumors contain specific changes in the RET gene. These alterations, including mutations and rearrangements, lead to abnormal proteins that promote tumor growth. Selpercatinib is a pill that is taken orally, to inhibit the activity of these abnormal RET proteins.

Trials have shown that treatment with selpercatinib increased the amount of time patients lived before the worsening of their cancer, called progression-free survival when compared to other available treatment options. RET alterations are present in nearly all hereditary medullary thyroid cancer and in up to half of cancers that are not the result of an inherited mutation. Advanced medullary thyroid cancer has been much more difficult to

treat than the other types of thyroid cancer.

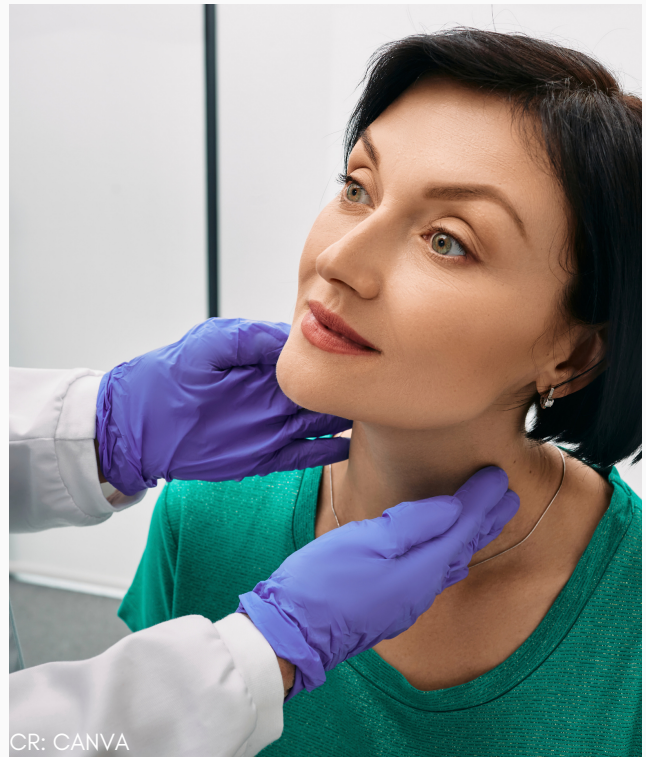
In the LIBRETTO-531 trial, which focused on medullary thyroid cancer with RET mutations that could not be removed by surgery or had spread to other parts of the body, selpercatinib outperformed other targeted treatments in terms of progression-free survival. Selpercatinib, a highly selective RET inhibitor, demonstrated higher response rates compared to multi-kinase inhibitors cabozantinib and vandetanib. The trial helped highlight the superior and more durable responses of selpercatinib with fewer side effects.

Side effects of selpercatinib in the trial included high blood pressure, dry mouth, and diarrhea, with a lower incidence than observed with the standard-of-care drugs. The trial emphasized the importance of precise targeting of RET, leading to fewer side effects. The results of this trial underscore the necessity of testing tumors for RET alterations at the time of diagnosis in individuals with medullary thyroid cancers. Selpercatinib is shown to be a standard first-line therapy for patients with RET-positive cancer.

Looking forward, the treatments available for RET-altered cancers continue to evolve. Pralsetinib, another highly selective RET inhibitor, is being studied, showing promise for medullary thyroid cancers. Next-generation RET inhibitors are also in development, with the goal of providing options for cancers that have become resistant to other therapies, including first-generation RET inhibitors. The data from this trial represents a step towards more personalized approaches to treating thyroid cancers.

Learn more here:

<https://www.cancer.gov/news-events/cancer-currents-blog/2023/selpercatinib-ret-lung-medullary-thyroid>



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E-MERGE: STEM WORKSHOP

Are you interested in learning more about Science? Do you want your child to expand their horizons in STEM? MEDIC is holding E-Merge, a STEM workshop geared towards students from Grades 8 to 12 with an interest in STEM. Led by a team of experienced UBC students whom are experts in their fields, expect an afternoon filled with engaging activities, insightful learning, and novel innovation.

No previous experience is necessary, simply come with a passion for learning and a desire to create!

Time: 1:00PM-5:00PM

Location: Abdul Ladha Science Centre

Registration fee: \$20.00

Registration is on our website. Spaces are limited.

CERVICAL CANCER: SCREENING AND FUTURE RESEARCH

By: Simone Abraham

Cervical Cancer is the growth of abnormal cells in the lining of the cervix. It is a significant global health concern, affecting women of all ages and backgrounds. The most common cervical cancer is squamous cell carcinoma, which accounts for around 80% of cases. Adenocarcinoma is less common and more difficult to diagnose since it starts higher in the cervix.

Statistics show that the incidence of cervical cancer has significantly decreased since the National Cervical Screening Program began in 1991 and a national Human Papilloma Virus (HPV) vaccine program was introduced in 2007. With the advent of preventative measures like vaccinations, it is possible to reduce the incidence of this disease making it curable. Preventing this involves vaccination against the human papillomavirus (HPV), booking regular screening appointments, and promoting healthy lifestyle choices.

Cervical Cancer Screening at regular intervals is one of the top strategies to prevent and treat cervical cancer early. Testing for human papillomavirus (HPV), a virus that causes an estimated 90% of cervical cancer cases as well as the Pap smear are screening tools recommended for women aged 25 and older. The American Cancer Society recommends HPV testing alone every five years for women



between the ages of 25 to 65, and if this option isn't available, it is recommended they get a combined HPV/Pap test every five years or a Pap Test every three years. For women over the age of 65 whose prior tests were normal, regular screenings are not required.

One of the most important lifestyle decisions one can make to prevent cervical cancer as well as many other types of cancer is to avoid smoking. The toxins present in tobacco smoke weaken the body's immune system and damage cellular DNA - which leads to cancer growth in the body. Including a balanced diet and regular exercise in one's daily routine can help contribute to overall well-being and reduce the risk of cervical cancer.

Empowering women with knowledge about cervical cancer, its symptoms, and preventative measures is crucial. By improving awareness on the subject, preventative measures become more well-known, which helps reduce overall rates of cervical cancer. By providing education, it can help clear common misconceptions about the subject and thereby encourage

women to take proactive steps toward prevention. By enabling women with the resources to take charge of their health, it can help in the prevention of cervical cancer. Cervical cancer once detected is treatable making it important for it to be diagnosed early. Through lifestyle changes, regular screenings, and education the rates of cervical cancer can greatly be reduced.

Learn more here:

<https://www.cancer.org.au/cancer-information/types-of-cancer/cervical-cancer>

<https://my.clevelandclinic.org/health/diseases/12216-cervical-cancer>

<https://www.moffitt.org/cancers/cervical-cancer/faqs/how-to-prevent-cervical-cancer/>



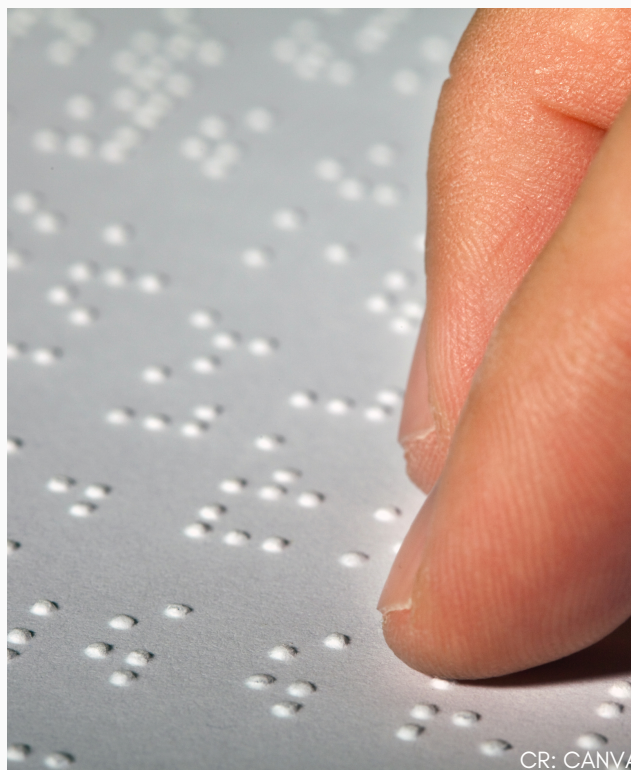
WORLD BRAILLE DAY: INCLUSIVITY WORLDWIDE

By: Mihika Mishra

World Braille Day, celebrated on January 4th, commemorates the birth of Louis Braille, the inventor of the tactile reading system. Braille consists of a unique arrangement of six dots that form alphabetic and numerical symbols, enabling its use by visually impaired individuals globally. The symbols grant access to reading materials typically presented visually in prints or writing.

2023 marks the fourth year of celebrating World Braille Day, intended to raise awareness of the pivotal role Braille plays in communication. Its application extends across a myriad of daily tasks, from public transportation and within stores, to education and social interactions. By enhancing public access to Braille, locations become more navigable, alleviating anxiety and boosting the independence and confidence of blind and partially sighted individuals.

According to the UN, 1 billion people worldwide grapple with disabilities, often facing challenges in healthcare, education, employment, and community participation. The visually impaired, particularly during the COVID-19 pandemic, encountered additional hurdles due to lockdowns and restrictions. Relying on touch for information intake, the lack of accessible media hindered the dissemination of crucial



information, highlighting the marginalized position of those with disabilities in 'crisis-affected communities'.

This underscores the need for global action to enhance accessibility and information communication. World Braille Day serves as a reminder of the ongoing efforts required to build a more inclusive community. In recognizing the challenges faced by the visually impaired, it becomes imperative to provide measures that ensure their active participation in society, fostering a world where accessibility is a universal standard.

Learn more here:

<https://nfb.org/celebrate-world-braille-day>

<https://www.un.org/en/observances/braille-day>

WORLD NTD DAY: SOLUTIONS FOR THE VULNERABLE

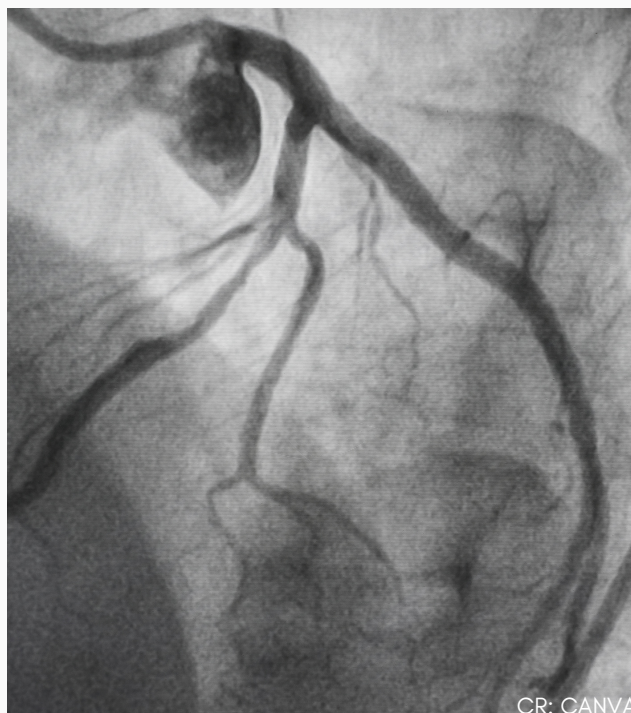
By: Mihika Mishra

January 30th marks World Neglected Tropical Diseases Day, observed to raise awareness of Neglected Tropical Diseases (NTDs), increase support for creating solutions, and ultimately eradicate them, while celebrating accomplishments already made.

Defined by World NTD Day, NTDs consist of "20 preventable and treatable diseases that place a heavy burden on over 1.7 billion people worldwide." Prevalent in marginalized communities, they affect the most vulnerable, often in remote areas, causing disabilities and disfigurement. Their impact extends beyond medical aspects, affecting social acceptance, education, and livelihoods. According to DNDi, since 2012, 34 countries have eradicated at least one NTD, raising the current number to 43 countries.

In 2003, the not-for-profit organization, with the participation of the World Health Organization Special Programme on Research and Training in Tropical Diseases and Médecins Sans Frontières (MSF), was founded as the Drugs for Neglected Diseases initiative (DNDi).

DNDi focuses on developing and delivering medications to combat NTDs in vulnerable communities globally. Their latest development targeted sleeping sickness, also called human African trypanosomiasis



(HAT), resulting in the creation of the oral drug Fexinidazole. Sleeping sickness, caused by microscopic parasites (*Trypanosoma brucei*) transmitted by the tsetse fly, disrupts sleep cycles in later stages, with earlier symptoms including fevers, headaches, and enlarged lymph nodes. Two subspecies, *T. gambiense* and *T. rhodiense*, cause different disease patterns in humans.

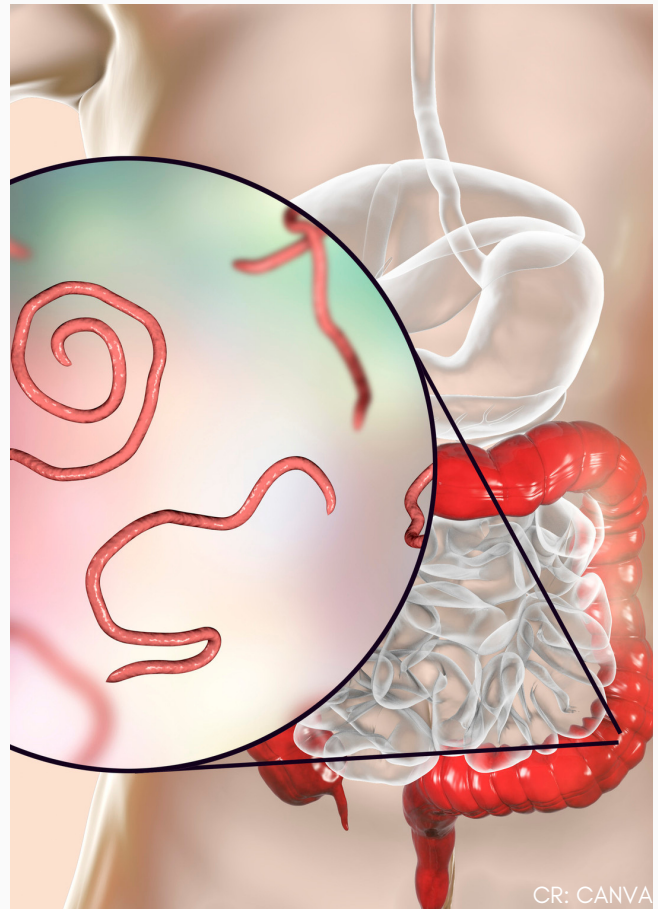
Fexinidazole, indicated as a treatment for *T.b gambiense* sleeping sickness, addresses a more common form of the disease. However, *T.b rhodesiense* sleeping sickness, a less common and rapidly progressing acute form, required an adequate treatment, as it could cause death within weeks or months if left untreated. DNDi notes that the only treatment available for stage 2 of the sickness was the toxic arsenic drug melarsoprol, contributing to the death of about 10% of patients. For stage 1, the

treatment was a less toxic drug called suramin, involving five intravenous injections administered every seven days for over a month. Fexinidazole, taken orally over 10 days, provides a much more favorable alternative, reducing pain and the need for hospitalization.

Data shows that fexinidazole is effective in treating *T.b rhodiense* and serves as a safer alternative. In December 2023, the European Medicines Agency's Committee for Medicinal Products for Human Use "adopted a positive opinion" for fexinidazole as a treatment for *T.b rhodesiense*. Going into the future, DNDi aims to develop safe and effective treatments against Stages 1 and 2 of sleeping sickness for both subspecies of the parasite.

Learn more here:

<https://worldntdday.org/learn-more/>



LOST MEMORIES: ALZHEIMER'S AWARENESS MONTH

By: Gina Zhang

Alzheimer's is a disease that affects around 50 million people around the world. This neurodegenerative disease that affects thinking, movements, and behaviours of the patient. There is no current cure for the disease, but there are treatments available to temporarily slow down symptoms

The biggest obstacle when facing Alzheimers usually falls on the shoulders of caretakers. The diagnosed patients are

oftentimes a decrease in social skills and daily tasks can become a major struggle. While many families around the world take it upon themselves to care for the patient, this can cause incredible mental stress and physical exertion for both the diagnosed of their loved one. Caretaker support continues to be a shortcoming for social systems, and households are left struggling to make ends meet,

Alternative options include hiring professional medical care that help the patient into a transition into a more reduced stage of their normal lifestyle. However, hiring these professionals can oftentimes be expensive, and such budget is not granted for many households around the world. As a result, healthcare bills can be burdensome.

The origins of Alzheimers are largely still a mystery, however for decades, it was theorized to be rooted from changes in protein levels in the brain. The disease disproportionately affects the older generations, and is strongly connected with family genetics and history. Studies have proven that changes in lifestyle can lead to a decreased risk associated with Alzheimers, such as changes in diet, exercise, and alcohol consumption.

Warning signs of Alzheimers can include common memory loss, trouble with financial handling, and decreased judgement. These symptoms can sometimes be common across other diseases, but further testing must be conducted to comprehend the gravity of diagnosis.

Dementia, is characterized by memory loss and is used as a wider umbrella term to describe all diseases involving memory loss. Alzheimers is included under such umbrella, but cannot be interchanged with this term.

Aging can sometimes be associated with memory loss and the loss of motor functions. However, such behaviours are not necessarily all due to Alzheimers, but misdiagnoses can occur due to the similarity and overlap of symptoms. This misdiagnosis of the elderly population has led to the unneeded treatment, unnecessary costs of medical care, and the misuse of medication. As a result, there has been intense calls for doctors to be particularly careful when diagnosing patients and providing seniors with only the utmost of necessary care.

As the world continues to search for a cure, this disease continues to haunt the families of millions. Alzheimers is daunting, yet loved ones seem to rally around the patient the most post-diagnosis. With such support and security, patients who have Alzheimers are imbued in a sense of peace that can be just as needed as a cure.

Learn more here:
<https://www.alz.org/alzheimers-dementia/what-is-alzheimers>





CREDITS

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