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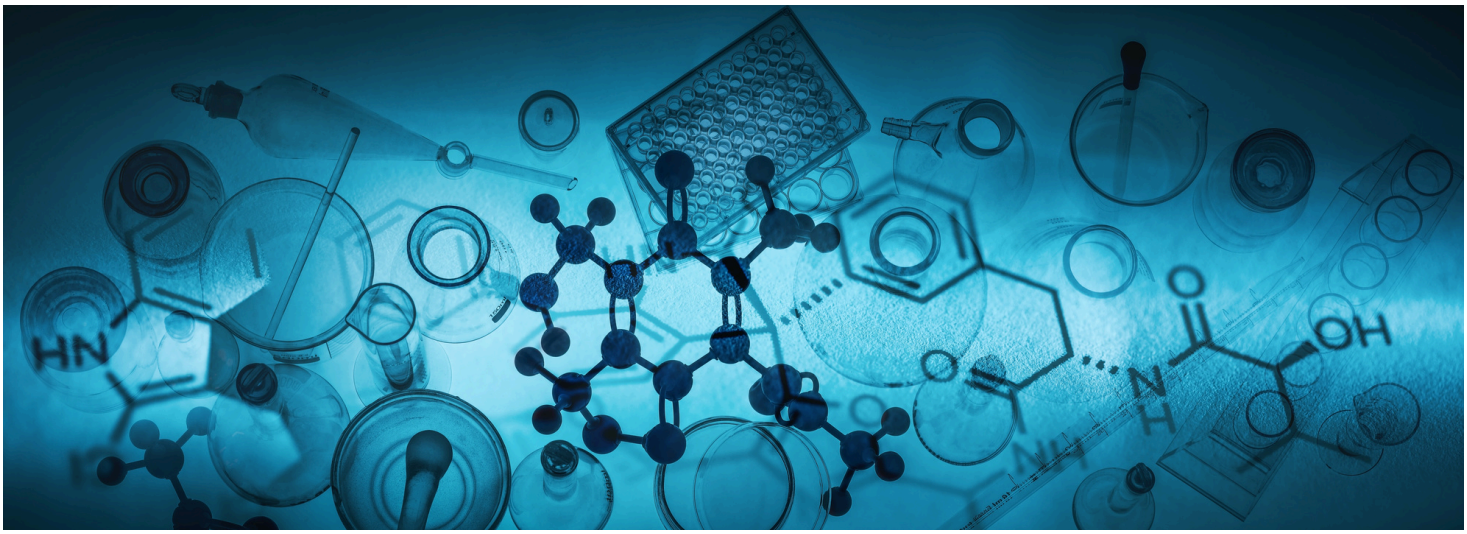
THE MONTHLY DOSE

Official Newsletter of The Mueller Health Foundation



WHAT'S NEW AT THE MUELLER HEALTH FOUNDATION:

We at the Mueller Health Foundation are diligently preparing for several exciting projects and collaborations this fall.

We are particularly thrilled to continue co-leading the Education Subgroup of the NYC TB Free Coalition, which will resume activities in early September.

Together with our group of 14 experts, we have already produced numerous educational materials for new arrivals in NYC, emphasizing pictorial illustrations to raise awareness for tuberculosis.

We look forward to expanding this work and creating additional materials to also educate providers and healthcare workers in the NYC area.

Stay tuned for more updates!

LATEST NEWS: SHOWCASING STORIES OF TB SURVIVORS

We at The Mueller Health Foundation continue to be deeply committed to sharing personal stories and giving a voice to TB patients, TB survivors, TB practitioners, and all the friends and family members of the people who have been affected by the disease. We are also proud to continue our support of our HeroRat Carolina who has been trained by APOPO, a charity focused on training rats to detect TB in sputum samples across Africa. APOPO has put together a wonderful collection of success stories from TB survivors and this month we would like to highlight Ally's story, a 14-year-old who lives with his mother and stepfather in Toangoma, Dar es Salaam :

Before noticing blood, Ally did not feel too bad. Despite losing weight, he remained active and ate well, though he felt more tired and had night sweats, which they attributed to the hot climate of Dar es Salaam. However, his persistent cough did not improve despite his mother's efforts. When he started coughing up blood, he got scared and informed his mother, who took him to their local clinic. They were then referred to Mbagala Zakhem Hospital. At Zakhem Hospital, the doctor listened to his lungs and requested a sputum sample to test for tuberculosis. The next day, they were informed that Ally had TB. APOPO, which uses trained rats to detect TB, had identified his illness, and the hospital confirmed it. His mother was shocked as they did not know much about TB. The hospital staff educated them about TB, its transmission, and preventive measures. Learning about the symptoms, Ally realized that his cough, weight loss, and fatigue were all signs of TB. He began immediate treatment with large pills, determined to complete the six-month course. After staying home from school for a while to complete his treatment, Ally returned and is currently catching up with his studies. He has openly discussed his condition with his friends and is preparing for his National exams in class seven. He dreams of becoming a soldier like his uncle and is grateful to APOPO and the clinic for diagnosing his TB and providing treatment. He remains determined to stay strong and healthy to achieve his dream. To read his full story please follow the link here: https://apopo.org/what-we-do/detecting-tuberculosis/success-stories/ally/

For more news, please also take a look at our top 3 picks for **July** in this newsletter, where we highlight novel research findings and news around the prevention and treatment of tuberculosis around the world.

The Mueller Health Foundation

MHF TOP PICKS FOR JULY

Every month, we at the Mueller Health Foundation like to showcase interesting news and updates in the field of tuberculosis (TB). Below are our top **3** picks for **July:**

1. South Africa and J&J Reach a Deal to Widen Access to a Key Tuberculosis Treatment

South African antitrust authorities ended an investigation into Johnson & Johnson and its Janssen subsidiary over excessive pricing of a lifesaving tuberculosis drug after the companies took steps to lower the cost and widen access to the medicine. In a brief statement, the Competition Commission explained that J&J and Janssen agreed not to enforce a so-called secondary patent on bedaquiline, which is also sold under the brand name Sirturo, a step that makes it possible for generic companies to supply a lower-cost version. At the same time, the companies agreed to lower the price charged to the National Department of Health by about 40%. To learn more, you can access the full article at: https://www.cidrap.umn.edu/tuberculosis/jj-agrees-lower-price-tb-drug-bedaquiline-allow-production-south-africa

2.Study Finds Heterogeneity in Lung Macrophage Control of Mycobacterium Tuberculosis is Modulated by T Cells

Following Mycobacterium tuberculosis infection, alveolar macrophages are initially infected but ineffectively restrict bacterial replication. The distribution of M. tuberculosis among different cell types in the lung changes with the onset of T cell immunity when the dominant infected cellular niche shifts from alveolar to monocyte-derived macrophages (MDM). The researchers hypothesized that changes in bacterial distribution among different cell types is driven by differences in T cell recognition of infected cells and their subsequent activation of antimicrobial effector mechanisms. The study shows that CD4 and CD8 T cells efficiently eliminate M. tuberculosis infection in alveolar macrophages, but they have less impact on suppressing infection in MDM, which may be a bacterial niche. Importantly, CD4 T cell responses enhance MDM recruitment to the lung. Thus, the outcome of infection depends on the interaction between the T cell subset and the infected cell; both contribute to the resolution and persistence of the infection. To learn more, you can read about the research here: https://www.nature.com/articles/s41467-024-48515-7

3.Dynamic Microfluidic Single-Cell Screening Identifies Pheno-Tuning Compounds (PTC) to Potentiate Tuberculosis Therapy

Drug-recalcitrant infections are a leading global-health concern. Bacterial cells benefit from phenotypic variation, which can suggest effective antimicrobial strategies. However, probing phenotypic variation entails spatiotemporal analysis of individual cells that is technically challenging, and hard to integrate into drug discovery. In this work, the researchers developed a multi-condition microfluidic platform suitable for imaging two-dimensional growth of bacterial cells during transitions between separate environmental conditions. With this platform, the scientists implemented a dynamic single-cell screening for pheno-tuning compounds (PTC), which induce a phenotypic change and decrease cell-to-cell variation, aiming to undermine the entire bacterial population and make it more vulnerable to other drugs. The researchers applied this strategy to mycobacteria, as tuberculosis poses a major public-health threat. The study founds that the lead compound, PTC M06, impaired Mycobacterium tuberculosis via a peculiar mode of action and enhanced other anti-tubercular drugs. This work proves that harnessing phenotypic variation represents a successful approach to tackle pathogens that are increasingly difficult to treat. You can read the full paper here: https://www.nature.com/articles/s41467-024-48269-2

DID YOU KNOW?

A recent report has shed more light on the increasing challenges that prisons in the Philippines face in managing the spread and treatment of tuberculosis among inmates. Below are some key facts:

- The Philippines ranks fourth globally in the number of TB prison infections, surpassed only by Brazil, Russia, and China.
- In the first three months of this year, just over 39,000 new and relapsed TB cases were reported in penal institutions in the Philippines, according to figures the Department of Health's Epidemiology Bureau. This constitutes an increase from roughly 32,500 over the same period in 2023.
- According to the Department for Health's latest annual briefing, the TB infection rate still stands at 1,777 per 100,000 people in prisons, compared to 599 outside. Furthermore, other studies suggests that only about 53% of infected persons are diagnosed and treated within the prison systems.
- In addition to low rates of diagnosis, prisons face issues like lack of nutritious food, sporadic water shortages, and poorly ventilated, overheated cells.
- But one of the biggest constraints in identifying TB infections is the lack of prison-owned x-ray machines and a designated treatment facility within the premises. Only one mobile van, operated by Philippine Business for Social Progress, travels across the country to offer healthcare to remote communities and incarcerated populations. However, the van only visits incarceration facilities once a year, if at all.
- More support and funding are needed to address the lack of facilities, health personnel, resources, and medical equipment in prisons.

Information Source:
https://www.telegraph.co.uk/global-health/science-and-disease/the-filipino-jails-struggling-to-contain-an-ancient-killer/