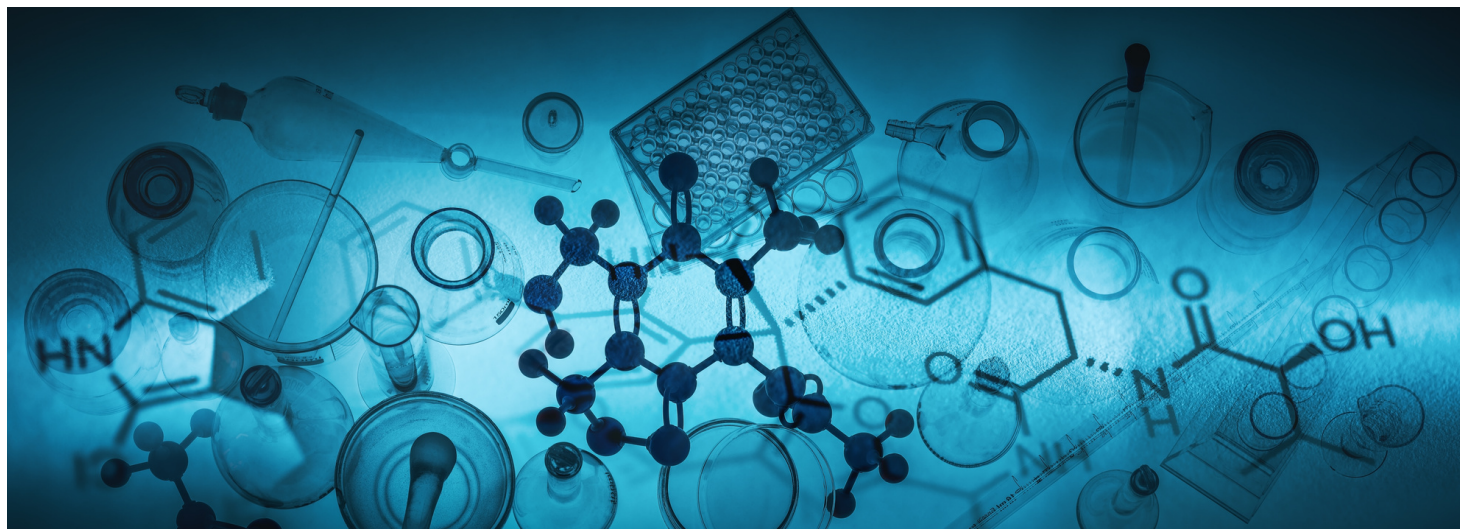


THE MONTHLY DOSE

Official Newsletter of The Mueller Health Foundation



WHAT'S NEW AT THE MUELLER HEALTH FOUNDATION:

Since our HeroRat Carolina retired last month, we are excited to introduce her successor and our newest team member, Tamasha!

Born on December 19, 2022, in Tanzania, Tamasha is a friendly and curious African giant pouched rat with a lively personality who quickly showed her aptitude in TB detection training and will continue the great work that Carolina has been doing.

Tamasha is calm and approachable, always greeting new people in a friendly way and she is also quite playful! She enjoys jumping, climbing, and sometimes even does a joyful little dance when placed in the TB evaluation enclosure – as if celebrating her enthusiasm for the work ahead!

Welcome to the team, Tamasha!



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 new HeroRat Tamasha 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 Claudi's story:

Claudi is a six-year-old boy living in Dar es Salaam, Tanzania. When he became very sick, his grandmother took him to a local clinic for help. At the clinic, the doctor examined Claudi and suspected that he might have tuberculosis. While there, Claudi and his grandmother met Lulu, a volunteer from APOPO's partner organization, MKUTA. Lulu, who had previously experienced TB herself, now helps others by providing advice about the disease. Lulu bravely assisted Claudi in giving his sputum sample, which required him to cough a lot. However, despite the clinic's efforts, they were unable to detect the cause of his illness. Claudi returned home to his family and spent time helping his grandfather with his pigeons. Unfortunately, Claudi's condition worsened over time, and soon his little sister also became sick. Claudi began to worry about his friends at school and feared they might get sick too. Suzanna John, a community member, recalled, "Claudi coughed a lot and became too weak to come to school." One day, the clinic called with important news: Claudi had been diagnosed with tuberculosis. His sputum sample had been sent to APOPO, where trained rats examined it. After the rats flagged Claudi's sample, the APOPO lab re-checked it and confirmed the presence of TB. The clinic was informed, and Claudi's diagnosis was finalized. His sister's TB was also identified by the local clinic, and she was fortunate to receive treatment as well. Lulu visited Claudi's home to deliver the treatment and explained how to take it correctly. Claudi began feeling better almost immediately and was able to return to school. Lulu even conducted a community session at Claudi's home to teach everyone about the dangers of TB. Claudi felt proud as he shared what he had learned with his friends. Now fully recovered, Claudi enjoys playing football with his brother again and is happy to be back at school, continuing his education. To read his full story, please follow the link here: <https://apopo.org/what-we-do/detecting-tuberculosis/success-stories/storiesclaudi/>

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

MHF TOP PICKS FOR DECEMBER

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 **December**:

1. Study Finds Weakness in Drug-Resistant Tuberculosis Pathogens

A recent study has uncovered potential weaknesses in drug-resistant strains of *Mycobacterium tuberculosis*, providing hope for combating the global challenge of tuberculosis. Drug resistance, particularly to the first-line antibiotic isoniazid, is often linked to mutations in the *katG* gene, which encodes the catalase-peroxidase enzyme KatG. Researchers hypothesized that the disrupted KatG activity in isoniazid-resistant strains could create collateral vulnerabilities. Using advanced tools such as whole-genome CRISPR interference (CRISPRi) screens, transcriptomics, and metabolomics, they identified key weaknesses in the physiology of *katG*-mutant TB strains. The study revealed that while metabolic and transcriptional reprogramming compensates for the loss of KatG, this adaptation generates vulnerabilities in critical processes such as respiration, ribosome biogenesis, and nucleotide and amino acid metabolism. Notably, these vulnerabilities were found to be more pronounced in isoniazid-resistant mutants, making them highly sensitive to targeted inhibition. This finding was validated in clinical isolates, suggesting that these druggable vulnerabilities could pave the way for new treatment strategies. To learn more, you can access the article at: <https://www.nature.com/articles/s41467-024-54072-w>

2. New Mechanism Uncovered Behind Immune Decline after Tuberculosis Treatment

Researchers at Baylor College of Medicine have identified a mechanism responsible for the persistent decline in immune function observed after successful tuberculosis treatment. Their study reveals that severe infections like TB induce lasting epigenetic changes—specifically, increased DNA methylation—that suppress immune responses, elevating the risk of subsequent infections. The team discovered that heightened activity in the tricarboxylic acid (TCA) cycle, a central metabolic pathway, correlates with these epigenetic modifications. By administering everolimus, an inhibitor of TCA cycle activation, alongside standard TB antibiotics, they effectively reduced harmful DNA methylation marks in patients, suggesting a potential strategy to restore immune function post-infection. This approach holds promise not only for TB but also for enhancing immune recovery following other severe infections. To learn more, you can read about the study here: <https://www.pnas.org/doi/10.1073/pnas.2404841121>

3. Report Finds Tuberculosis in Scotland is More Common Among Foreign-Born Residents

In 2023, Scotland experienced a significant 40% rise in tuberculosis (TB) cases, totaling 283, the highest since 2017. Notably, over two-thirds of these cases were among individuals born outside the UK, with an incidence rate 19.2 times higher than that of UK-born residents. Public Health Scotland suggests that many non-UK-born individuals may carry a latent, asymptomatic TB infection that becomes active after arriving in the UK. Additional factors include possible transmission within the UK and frequent travel to countries with high TB prevalence. The report also highlights a strong association between TB and socioeconomic deprivation, as nearly 31% of cases occurred in the most deprived areas, compared to 10% in the most affluent regions. NHS Greater Glasgow and Clyde reported the highest number of cases at 108, with males aged 25 to 34 being the most affected demographic. Despite this uptick, Scotland remains classified as a low-incidence country for TB. You can read the full article here: <https://www.bbc.com/news/articles/c0m0m2epd1ro>

DID YOU KNOW?

In the wake of the devastating 2019 fire at Paris's Notre-Dame Cathedral, archaeologists recently uncovered an extraordinary find beneath the floors: two lead coffins, also known as sarcophagi.

One of the sarcophagi was identified as belonging to Antoine de la Porte, a prominent canon who passed away in 1710. The second discovery was even more intriguing. It contained the remains of a man in his mid-30s who showed signs of tuberculosis and meningitis—diseases that plagued him during his final years.

Forensic analysis and historical context suggest that these remains could belong to Joachim du Bellay, a celebrated French Renaissance poet known for his poignant and melancholic works. Du Bellay, who died in 1560 at the age of 37, had long been a historical mystery regarding his burial location. This discovery provides a compelling new chapter in understanding his life and death.

This remarkable discovery intertwines art, history, and science, offering a deeper look into the life of one of France's literary icons while highlighting the health struggles of a bygone era. It's a poignant reminder of the intersection between culture and the human condition across centuries.

The find is not just a window into 16th-century burial practices but also a reminder of the enduring toll of tuberculosis, a disease that was rampant during Du Bellay's time and remains a major global health challenge today.



Information Source:
<https://news.artnet.com/art-world/renaissance-poet-sarcophagus-remains-notre-dame-2539225#:~:text=Analysis%20on%20the%20skeleton%20revealed,prominent%20area%20of%20Notre%2DDame.>