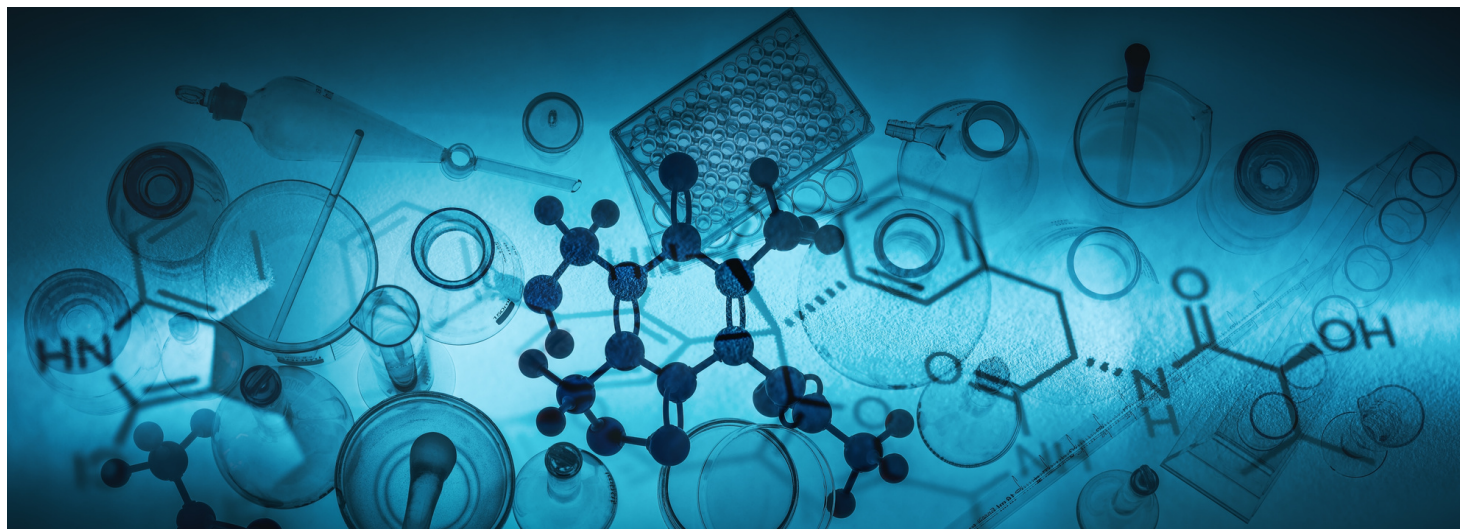


# THE MONTHLY DOSE

Official Newsletter of The Mueller Health Foundation



## WHAT'S NEW AT THE MUELLER HEALTH FOUNDATION:

We are delighted to share an update on our first adopted HeroRAT, Carolina, trained by APOPO, who is thriving in her well-deserved retirement! After years of dedicated service detecting tuberculosis, Carolina now enjoys her days relaxing at the Morogoro rat retirement facility in Tanzania, where she continues to receive the same loving care and attention she always has. Last month, Carolina celebrated her 9th birthday with her favorite treats. We couldn't be prouder of her incredible contributions to global health. Happy Birthday, Carolina!



PC: APOPO HeroRats

## LATEST NEWS: SHOWCASING STORIES OF TB SURVIVORS

We at The Mueller Health Foundation remain deeply committed to sharing personal stories and giving a voice to TB patients, TB survivors, TB practitioners, and all the friends and family members affected by the disease. We are also proud to continue our support of our 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 Rajabu's story:

Rajabu, a 40-year-old man living in Dar es Salaam, shares the profound impact tuberculosis has had on his life and family. Married with four children under the age of fifteen, he was once the main provider but has been unable to work since falling ill. What began as fatigue, fever, and loss of appetite soon progressed to abdominal pain, prompting him to visit a clinic. After several medical tests, including an abdominal ultrasound, his TB diagnosis was finally confirmed through sputum testing, where one of his samples was analyzed by APOPO's trained rats. The diagnosis was difficult to accept, marking the start of a long and uncertain journey. Although his TB medication is provided free of charge, Rajabu must walk to the clinic each day, as he cannot afford transportation. The treatment's side effects, such as dizziness, nausea, and aching joints, are compounded by hunger, as his family often survives on just one meal a day. Since beginning his treatment, Rajabu has noticed gradual improvements: the fever and sweating have subsided, and he feels physically stronger. Still, the social stigma surrounding TB has made it difficult for him to find work, and his family's financial situation remains dire. He has had to borrow money for food and basic needs, and school fees and supplies for his children are now unaffordable. Despite these struggles, he remains hopeful and determined to recover so that he can return to work and rebuild his family's stability. To read his full story, please follow the link: <https://apopo.org/what-we-do/detecting-tuberculosis/success-stories/rajabu?v=0b3b97fa6688>

For more news, please also take a look at our top 3 picks for **November** 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 NOVEMBER

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 **November**:

## 1. AI-Driven Pharmacometrics Has the Potential to Transform Tuberculosis Treatment

A recent study highlights how the integration of artificial intelligence with pharmacometric modeling is poised to revolutionize the treatment of TB and Malaria in Africa. Traditional “one-size-fits-all” dosing regimens often fail to account for individual variability in drug absorption, metabolism, pathogen behavior, and host factors, leading to sub-optimal outcomes and increased risk of drug resistance. The new approach leverages machine-learning algorithms trained on extensive African clinical and biological datasets, combined with mechanistic pharmacokinetic/pharmacodynamic models, to predict patient responses and tailor dosing accordingly. By simulating many dosing strategies in silico, the hybrid platform aims to identify optimal regimens that maximize efficacy, minimize toxicity, and reduce resource burden in low-resource settings. Beyond TB, the framework holds promise for other infectious diseases, though its success depends on investments in data infrastructure, regulatory frameworks, and equitable access. To learn more, you can access the article here: <https://www.nature.com/articles/s41467-025-64304-2>

## 2. Cytochrome bc1 Inhibitors Offer Hope for TB Treatment

Researchers are exploring a class of drugs called cytochrome bc1 inhibitors that could revolutionize TB treatment by disabling the bacterium’s essential respiratory enzyme complex. The enzyme, a key component of the pathogen’s energy-metabolism system, drives the production of ATP, a molecule that stores and supplies energy essential for cellular function. Disrupting this process effectively starves the bacteria of the energy it needs to survive. This approach stands out because the inhibitors are highly selective for the bacterial enzyme, minimizing damage to human cells, and offer promising pharmacokinetic advances, including better penetration into the granulomas where TB bacteria hide. Early research suggests that when used in combination with existing antibiotics, these inhibitors could shorten treatment times, reduce side effects, and cut the risk of drug resistance. While further clinical trials and safety evaluations are still needed, the study represents a significant shift toward precision-targeted TB therapies, potentially changing the landscape of global TB treatment. To learn more, you can access the paper here: <https://www.nature.com/articles/s41467-025-64427-6>

## 3. “Cough-Simulator” System Sheds New Light on TB Transmission

Researchers have developed a novel Transmission Simulation System (TSS) that mimics the human cough and aerosol behavior of tuberculosis with unprecedented precision. The TSS replicates realistic aerosol concentrations and particle-size distributions seen in active TB patients and allows accurate deposition of low bacterial doses into experimental subjects, which is far more refined than older nebulizer-based models. This advance promises to accelerate studies of how TB spreads through the air and could transform the development of vaccines and therapies specifically designed to intercept transmission. You can read the paper here: <https://journals.asm.org/doi/10.1128/mbio.00958-25>

## DID YOU KNOW?

A new modeling study by Harvard T.H. Chan School of Public Health and Boston University School of Public Health projects that if U.S. bilateral health aid and contributions to the Global Fund to Fight AIDS, Tuberculosis and Malaria continue to be slashed, low- and middle-income countries could see significant increases in child TB cases and deaths:

- The study projects that between 2025 and 2034, Global Fund and U.S. funding cuts collectively could lead to an estimated 8.9 million additional childhood tuberculosis cases and over 1.5 million preventable child deaths worldwide.
- The modeling estimates that the more immediate scenario, meaning cuts in U.S. aid alone without Global Fund impact, would lead to about 2.5 million additional pediatric TB cases and 340,000 deaths in the same period.
- These figures are based on data from 130 countries, focusing specifically on children under 15 who are particularly vulnerable to TB, especially in regions with overlapping HIV burdens.
- The authors warn that decades of progress in reducing TB incidence and mortality could be reversed, undermining health systems and putting millions of children at heightened risk.
- Importantly, the study also finds that if funding were restored after just one year of interruption, up to 90% of the projected additional child deaths could be avoided.

While funding cuts threaten to undermine progress in childhood TB control, this moment also presents a critical opportunity to mobilize global solidarity, foster innovative partnerships, and renew investment in child health through sustainable, equity-driven financing mechanisms that can accelerate progress toward TB elimination.