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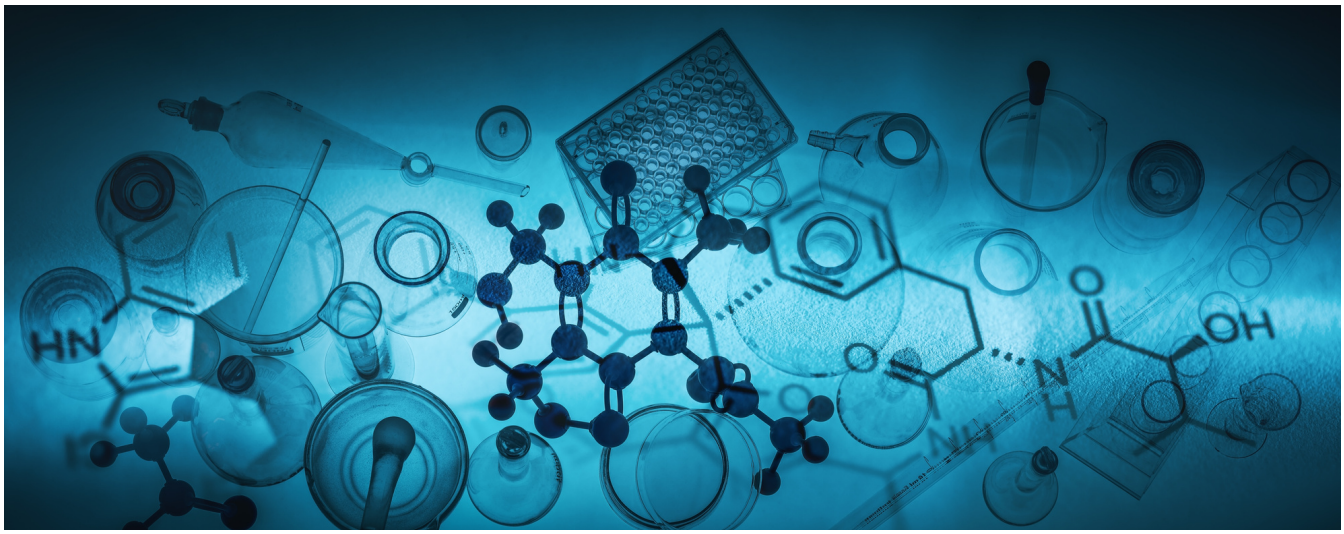
THE MONTHLY DOSE

Official Newsletter of The Mueller Health Foundation



WHAT'S NEW AT THE MUELLER HEALTH FOUNDATION:

We at The Mueller Health Foundation want to wish everyone a healthy and happy holiday season and a great start to the New Year 2024!

We are grateful to all the people working very hard everyday to make a difference by helping those affected by tuberculosis around the globe.

We very much look forward to many great collaborations in the New Year 2024 and are thankful for all of the great work that has been accomplished throughout 2023.

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. TB Alert, a charity focused on TB in the United Kingdom, has put together a wonderful collection of stories and this month we would like to highlight Arthensia's story:

It had taken a year to gain a TB diagnosis for Arthensia. Prior to her diagnosis, she had been prescribed allergy treatments by her General Practitioner (GP) and had even attempted to treat herself with cold remedies. By the time she went to the hospital after a year of unsuccessful treatment, she had fluid in her lungs and stomach, and an enlarged liver. When she looked at herself in the mirror, she was no longer the same person. She had lost a lot of body fat in a short time, but her stomach area looked like a woman who was six months pregnant. Her period had stopped. She had gone to the hospital just in time as she felt much worse after that. Once it was confirmed that she had TB, they started her on treatment. She was off work for eight months due to her health and appearance. She also had to have blood transfusions as she was badly anaemic. Her weight was checked regularly and she received iron injections. After a few months of treatment, she regained weight, her appearance improved and her body did not hurt as much although her lungs were still delicate. The lymph node behind her stomach will always remain enlarged. Reflecting back on her experience, she says: "There had been an increase in TB around the time I started to feel ill, I heard, though it had not been made well known. Still, I felt my GP that I had seen in the year leading up to my TB diagnosis should have taken more interest in my symptoms. The head GP there said it should have been diagnosed. I suppose he has seen many cases." A key lesson she takes away from her experience is: "What has to be understood is that you don't have to travel to get TB, it is around and will always be around. And I say to anyone persist with your GP and ask for more testing, I did ask for some, but not enough and nearly paid the price for it." To read her full story please follow the link here: https://www.thetruthabouttb.org/tb-stories/arthensia/

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 around the prevention and treatment of tuberculosis around the world.

The Mueller Health Foundation

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 Natural Compound That Activates Macrophages to Fight Resistant Tuberculosis Bacteria

A few years ago, Prof. Bernd Plietker made a promising new class of natural substance-based active compounds accessible by developing a short and parallelizable total synthesis: polyprenylated polycyclic acylphloroglucinols (PPAP). Building on these initial results, he and his team, in cooperation with Prof. Steffen Stenger from Ulm University Hospital, have now been able to show that a specific PPAP, PPAP53, is able to activate human macrophages to fight resistant tuberculosis bacteria without being toxic to the macrophages themselves. Fighting TB within macrophages is a promising way of successfully combating the infection at an early stage and thus avoiding the development of resistance long before the symptoms of infection appear. Several tests have shown that PPAP53 exclusively fights intracellular TB by passing through or activating the cell membrane without damaging the macrophage. A further advantage of PPAP53 over existing drugs is that it does not lead to an increase in the concentration of liver enzymes. This prevents a decrease in the effectiveness of the treatment due to the undesired degradation of the active substance in the liver. To learn more, you can access the full paper at: https://pubs.acs.org/doi/10.1021/acs.jmedchem.3c01172

2. New Study Links Blood Glycerol Levels to Tuberculosis Severity in Type 2 Diabetes

A collaborative study between the A*STAR Infectious Diseases Labs (A*STAR ID Labs) and the University of Massachusetts (UMass) Chan Medical School has uncovered that elevated glycerol levels are responsible for increased severity of tuberculosis disease in experimental models with type 2 diabetes (T2D). The researchers of this study found that T2D led to more bacteria in the lung, tissue damage, and deaths when infected with Mycobacterium tuberculosis (Mtb), the bacterial pathogen responsible for causing TB. Notably, elevated blood glycerol, a sugar alcohol, emerged as a crucial factor influencing the interaction between T2D and TB. When the ability of Mtb to utilize glycerol for metabolism was blocked, by deleting an enzyme known as glycerol kinase, the severity of lung damage decreased. This indicated that Mtb can feed on glycerol to drive TB disease severity in T2D. As a result, people with T2D are more likely to be susceptible to TB because Mtb can utilize excess glycerol present in their blood and bodies, leading to more severe disease. To learn more, you can read the paper here: https://www.nature.com/articles/s41467-023-41519-9

3.Retrospective Observational Study Shows Emergence of Bedaqueline-Resistant TB in Mozambique

In this retrospective observational study, the researchers performed whole-genome sequencing of 704 rifampicin-resistant Mycobacterium tuberculosis complex (Mtbc) strains submitted to the National Tuberculosis Reference Laboratory (NTRL) in Maputo, Mozambique, between 2015 and 2021. Overall, 61 (9%) of 704 strains revealed resistance to bedaquiline. The study also found that the prevalence of bedaquiline resistance increased from 3% in 2016 to 14% in 2021 in Mozambique. Given the current diagnostic algorithms and treatment regimens, the emergence of bedaquiline resistance might jeopardise tuberculosis prevention and care unless sequencing-based technology is rolled out. You can learn more and access the full retrospective observational study here: https://www.thelancet.com/pdfs/journals/laninf/PIIS1473-3099(23)00498-X.pdf

DID YOU KNOW?

A new report released recently by Treatment Action Group (TAG) and the Stop TB Partnership has found that cumulative funding for tuberculosis (TB) research and development (R&D) over the past five years is falling shockingly short of commitments. Below, we have summarized key findings from the report:

- The $4.7 billion funding total reached for the period 2018-2022 is less than half of the $10 billion pledged by world leaders at the United Nations High-Level Meeting on TB (HLM) in 2018.
- Global funding for TB R&D was $1 billion in 2021 and $1.03 billion in 2022 – barely half of the $2 billion annual target agreed at the 2018 HLM.
- Current R&D funding levels are insufficient to produce and roll out the new tools needed to find, treat, and prevent the 10 million new cases of TB each year.
- Spending on TB vaccine R&D was 80% short of targets set by Stop TB Partnership's 2018–2022 Global Plan to End TB.
- Funding for drugs and diagnostics lagged behind targets by 75% and 35%, respectively.
- Funding from just two organizations – the United States National Institutes of Health and the Bill & Melinda Gates Foundation – accounted for over half of all expenditures on TB research in 2022.
- Global funders must play catch-up to compensate for years of underfunding and should allocate a minimum of $5 billion annually to TB R&D between now and 2030, as agreed by world leaders two months ago at the second UN High-Level Meeting on TB in September.
- Without an unprecedented mobilization of resources, the world will remain perilously off-track of making good on this historic commitment to finally defeat history's deadliest infectious disease – with an additional 6.6 million TB deaths by 2030 estimated if the status quo is maintained.

Information Source:
https://www.stoptb.org/news/new-report-tag-and-stop-tb-tb-rd-funding-perilously-off-track-of-un-commitments-to-end-tb-2030#:~:text=Key%20findings%20from%20the%20report,agreed%20at%20the%202018%20HLM.
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