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Editorial
Swiss TPH: 30 Years of R&D Towards New Drugs for Tropical Diseases

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Abstract: The year 2023 marks the 80th anniversary of the Swiss Tropical and Public Health Institute (Swiss TPH). Associated with the University of Basel, Swiss TPH combines research, education and services, working across a value chain from innovation and validation to application to improve people's health and well-being. Around 700 staff and students work in Swiss TPH's new headquarters in an emerging life-science cluster in Allschwil, Switzerland, focusing on infectious and non-communicable diseases, environment, society and health as well as health systems and interventions. In this special issue of *CHIMIA*, we highlight 30 years of research and development (R&D) at Swiss TPH, deeply grounded in partnership, towards new drugs for tropical diseases.

Keywords: Drugs · Infectious diseases of poverty · Neglected tropical diseases · Product development partnerships · Repurposing · Research and development · Swiss Tropical and Public Health Institute

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Pascal Mäser graduated from the University of Basel with a PhD in Microbiology. He moved to the University of California, San Diego, for postdoctoral research in plant physiology. In 2002 he returned to Switzerland, University of Bern, as an Assistant Professor in Molecular Parasitology. In 2009 he joined Swiss TPH. Currently, he is a Professor of Infection Biology at the University of Basel and Head of the Parasite Chemotherapy Unit at the Department of Medical Parasitology and Infection Biology at Swiss TPH. His research focuses on drug discovery for malaria and trypanosomatids, mode of drug action and mechanisms of drug resistance. Photo credit: Sandra Stampfli, Bern.

1. Once Upon a Time

Understanding where one comes from is crucial to provide a compass for the future. This reflection is particularly salient in our ever intertwined world where wicked problems abound.[1] In this Editorial, we briefly look back on Swiss TPH's history and 30 years of drug research and development (R&D) and then – with confidence – look ahead in this special issue of *CHIMIA*.

The Swiss Tropical and Public Health Institute (Swiss TPH) – formerly known as the Swiss Tropical Institute – was founded in 1943. The Second World War was in full swing; hence, it was a time of maximum international isolation. It needed foresight, courage and entrepreneurship to come up with a concept of building up a new tropical institute in Europe. The proposal made by the zoologist Rudolf Geigy and other professors at the University of Basel was met with enthusiasm at the Swiss federal level, and funding for a 3-year project was approved.[2] In the founding booklet, the following conclusion was given (translated from German): "*Should the institute prove its worth during an initial 3-year period, the intention is to convert the provisional institute into a definitive one with the justified hope that the federal government, the canton of Basel-Stadt and the private companies involved will also later help to create the financial basis and continue to subsidize the institute in the future.*"[3]

80 years have passed, and yet, this forward-looking perspective at an exceedingly difficult time in history is just as pertinent today as it was back then.

2. Key Developments

Despite many challenges in the 80-year history of Swiss TPH, the institute remained steadfast and pursued its mission to improve the health and well-being of people locally, nationally and around the globe. Key developments were the integration of the Institute for Social and Preventive Medicine from the Medical Faculty at the University of Basel in 2009, which brought about additional expertise in public health. Another milestone was the state treaty for the joint support of Swiss TPH by the cantons of Basel-Stadt and Basel-Landschaft that came into effect in 2017.

In 2022, Swiss TPH moved into its new headquarters 'Belo Horizonte', thereby serving as an anchor institute in an emerging and bustling life-science cluster in Allschwil, Switzerland. With more than 950 staff and students from 80 nations, 700 of whom now work in the new headquarters, Swiss TPH is the largest global

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health institute in Switzerland.[4] Research, education and services are pursued along a value chain from innovation to rigorous validation in real-world settings and application. Core competencies and strategic topics focus on infectious and non-communicable diseases, environment, society and health as well as health systems and interventions. A particularly rich vein of scientific and translational inquiry pertains to R&D towards new drugs for tropical diseases.

3. Thirty Years of R&D of Drugs for Tropical Diseases

"*Drug discovery in an academic setting? Better leave it to the experts from the pharma industry*!" Such criticism is often heard and frequently justified. However, in the case of neglected tropical diseases and other infectious diseases of poverty (*e.g.* malaria and tuberculosis), there was no choice. As their name implies, neglected tropical diseases and infectious diseases of poverty do not represent markets and lack strong lobbies. The patients are not paying customers, and thus – in spite of the high global need for new treatments – the drug pipelines at the turn of the millennium were drained. A detailed analysis of drug R&D for the period 1975–1999 revealed that among the 1,393 new chemical entities that had obtained market approval, only 16 (1.2%) products had a specific application for tropical diseases or tuberculosis.[5]

Recognizing the empty drug pipelines, coupled with a deficient market, a lack of innovative funding mechanisms and the considerable global burden posed by tropical diseases, a sea change occurred. First, the United Nations endorsed a global development agenda that pursued eight Millennium Development Goals (MDGs) in the period 2000–2015. Importantly, three of the eight MDGs pertained to health, and MDG 6 aimed at combating HIV/AIDS, malaria and neglected diseases.[6] Second, there was a significant increase in development assistance to the health sector, starting at around 1994 after the release of a landmark publication by the World Bank entitled 'Investing in health'.[7] Increased funding was observed until about 2015, mainly through the United States, United Kingdom, Germany and other high-income countries, as well as the Bill & Melinda Gates Foundation and other private philanthropy and cooperate donations.

The game changer was product development partnerships (PDPs), such as Medicines for Malaria Venture (MMV) and Drugs for Neglected Diseases *initiative* (DND*i*), which were established in the late 1990s/early 2000s.[8] In this setting, Swiss TPH proved its expertise in academic drug discovery. By repurposing know-how from medical parasitology, clinical research and modelling, Swiss TPH became a hub for R&D and remains an indispensable player in public-private drug discovery consortia for neglected tropical diseases and other infectious diseases of poverty, such as malaria.

"*Know thy enemy and know yourself*" (Sun Tzu, 6th century BC). A deep understanding of the pathogen as well as the patient has been crucial for the success of Swiss TPH in drug R&D. By combining expertise in infection biology – from the propagation of parasites to molecular genetics – with epidemiological and clinical know-how in the context of disease systems, Swiss TPH has enabled the development of new therapies for tropical diseases, including malaria, schistosomiasis, soil-transmitted helminthiasis, human African trypanosomiasis, Buruli ulcer, leishmaniasis and food-borne trematodiasis.

4. This Special Issue of *CHIMIA*

For the 80th anniversary of Swiss TPH, this special issue of *CHIMIA* commemorates these achievements with a collection of articles by authors from Swiss TPH (Neumayr & Künzli; Warryn & Pluschke; Meier *et al.*; Mäser *et al.*).[9] The issue is complemented with an interview by two trailblazers in the Basel area – Marcel Tanner, the President of the Swiss Academies of Arts and Sciences and Director Emeritus of Swiss TPH, and Lutz Hegemann, Head of Global Health & Sustainability at Novartis. They highlight how Basel became a hotspot for R&D for new drugs for tropical diseases. Two of the world's leading chemists are profiled – Kelly Chibale from the University of Cape Town in South Africa and Jonathan L. Vennerstrom from the Nebraska University Medical Center in the United States. These eminent researchers have devoted their working lives to the discovery and development of new drugs against tropical diseases and they have closely collaborated with many colleagues at Swiss TPH over the past 20 years. Finally, Anna K. H. Hirsch, a young professor at the Helmholtz Institute for Pharmaceutical Research in Saarbrücken (HIPS), Germany, is portrayed as a rising star in drug design and optimisation and new promising partner of Swiss TPH.

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Image on the cover page: 3D illustration of red blood cells infected with malaria parasites. The molecule is the drug candidate artefenomel (OZ439) synthesized by Jonathan L. Vennerstrom

The CHIMIA Editorial Board thanks the guest editors Prof. Jürg Utzinger and Prof. Pascal Mäser and all the collaborating authors for this fascinating insight into the work of Swiss TPH, illustrating the years of progress and achievements from research into improving the health and well-being of people locally, nationally and around the globe and demonstrating the immense value of collaborations in the public and private spheres both at home and abroad.