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Testimony of Aaron Sathyanesan PhD

In Support of HB91, relating to Ohio's TBITXL program

Chairman Young, Vice Chair Ritter, Ranking Member Piccolantonio, and all members of the Ohio House Workforce & Higher Education Committee, I am grateful for the opportunity to present written testimony on HB91, The Traumatic Brain Injury Treatment Accelerator Program (TBITXL). My name is Dr. Aaron Sathyanesan PhD, and I am a joint professor of neuroscience and engineering at the University of Dayton. My lab is dedicated to understanding how specific regions of the brain adapt following complex brain injuries, utilizing a neuroengineering approach that integrates cutting-edge optical, engineering, and machine-learning tools. I am here today to strongly support this bill, which seeks to fund essential research for developing treatments for traumatic brain injuries (TBI).

Traumatic brain injury is an urgent public health concern that profoundly impacts millions of Americans. The need for dedicated research and support is critical, especially considering that there is no FDA-approved therapy for TBI[1].

Traumatic Brain injuries are an acute problem that when left untreated can leave individuals with enduring symptoms and impairments such as Alzheimer's Disease, Parkinson's Disease, seizures, and strokes. Given that TBIs are often implicated as the source for so many of these other debilitating conditions, the traumatic brain injury treatment accelerator program aims to enhance our comprehension of multiple disease pathways.

However, our comprehension of the intricate biology behind traumatic brain injuries lags far behind that of many other therapeutic areas. The intricacies and complex nature of brain trauma have posed challenges for the private industry in developing effective treatments for decades. Many companies are now outsourcing key developmental activities due to the expertise and facilities required. Ohio has a unique opportunity to become a research hub for TBI, providing essential support and infrastructure for biotech companies and others developing treatments for TBI.

While the Department of Defense has made progress in preventing TBIs through measures like improved safety equipment as seen in automobile and military helmet technology, addressing injury-related disabilities remains a significant gap, underscoring the need for targeted research into therapeutics that can promote repair and recovery.

Regrettably, traumatic brain injury research funding is not proportionate to its impact on society. According to the National Council on Compensation Insurance (NCCI), traumatic brain injuries account for approximately 2.5% of all lost-time workers' compensation claims, but nearly 5% of the total medical payments associated with those claims, reflecting the high cost and complexity of TBI treatment. TBI is linked to significant morbidity and mortality especially among younger populations. However, as has been

[1] National Academies of Sciences Engineering, Medicine, *Traumatic Brain Injury: A Roadmap for Accelerating Progress* (The National Academies Press, Washington, DC, 2022; https://nap.nationalacademies.org/catalog/25394/traumatic-brain-injury-a-roadmap-for-accelerating-progress).

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pointed out by physicians from the Johns Hopkins School of Medicine and Stanford University School of Medicine in *The Journal of the American Medical Association,* TBI research is significantly underfunded by the National Institutes of Health (NIH) relative to its disease burden. In fiscal year 2023 for example, the NIH allocated only 0.4% of its budget to TBI research, despite injuries in general and TBI in particular contributing to millions of years of life lost in the US[2].

Translational research, the process of translating discoveries from basic science in the lab to therapies that benefit individuals, receives only a fraction of support. Within the NIH, translational research accounts for a significantly lower amount of research compared to other forms of research.

In 2023, funding allocated by the NIH for treating traumatic brain injuries amounted to a mere $192 million, ranking it among the lower-category of funded health conditions that year[3]. The NIH budget's only modest increases relative to GDP in the last two decades further accentuates the need to perpetually back this research. Innovative methods for financing medical research are imperative, considering that only one in five researchers who apply for grants at the NIH secure funding annually[4].

In addition to the NIH, the Defense Health Agency (DHA) is another significant funder of TBI research. In 2023 $175M in funding was provided to the Psychological Health and Traumatic Brain Injury (PHTBI) program and divided into 3 focus areas: (1) to understand, (2) to prevent, and (3) to treat TBI and psychological health conditions. To treat is further broken down into several subcategories that include:

- Reducing barriers to TBI treatment access in rural communities
- Creating mobile health applications to deliver TBI care
- Developing interventions for complications caused by TBI
- Developing therapeutic candidates to treat TBI and psychological issues.

Of the $175M in total funding, significantly low funds are directed to studying new or repurposed drugs to treat TBI, highlighting the need to increase investment in pharmaceutical research and development for this condition.

[2] H. Moses III, D. H. M. Matheson, S. Cairns-Smith, B. P. George, C. Palisch, E. R. Dorsey, The Anatomy of Medical Research: US and International Comparisons. *JAMA* **313**, 174–189 (2015).

[3] RePORT. https://report.nih.gov/funding/categorical-spending#/.

[4] NIH Extramural Nexus (News) | Grants & Funding. https://grants.nih.gov/news-events/nih-extramural-nexus-news.

Currently, the average cost to develop a new drug is around $870 million[5]. A $10 million dollar appropriation to start up TBITXL is a worthwhile investment that will attract small biotech companies to this state.

Moreover, in the absence of well-defined objectives and effective supervision, advancements are likely to be uncertain. Through sufficient funding and backing, Ohio has the opportunity to emerge as a frontrunner in translational TBI research by establishing itself as a central research hub. I urge you to endorse the proposed legislation aimed at financing translational TBI research in Ohio, thus facilitating progress, fostering innovation, and enhancing outcomes for all.

Chairman Young, Vice Chair Ritter, Ranking Member Piccolantonio, and all members of the Ohio House Workforce & Higher Education Committee, thank you for allowing me to submit written testimony today.

[5] A. Sertkaya, T. Beleche, A. Jessup, B. D. Sommers, Costs of Drug Development and Research and Development Intensity in the US, 2000-2018. *JAMA Network Open* **7**, e2415445 (2024).

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