PhysiOdyssey · 2025 · Vol 1, No. 1, pp. 8-14
https://doi.org/10.36399/tem23w95

Leading Physician Makes Medical Breakthrough

By Asha Waugh

In a recent monograph, Thomas Addison defied popular belief and revealed that the suprarenal glands can indeed be afflicted by disease, proving that they must have a vital physiological function.

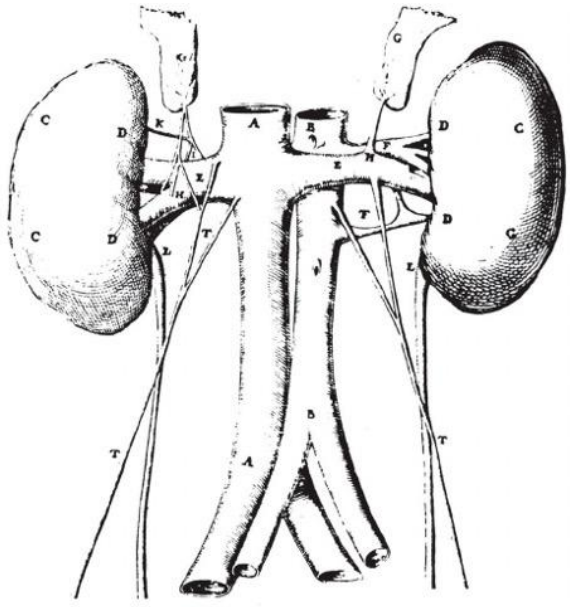
1. Photograph of Thomas Addison

Dearest reader, I invite you to envisage yourself standing outside the door behind which one of the greatest physicians of our time sits. You have spent days frantically corresponding with the staff at Guy's Hospital, London, and upon a chance cancellation, urgently travelled the length of the country for an interview, lest the opportunity be snatched by another. The idea that you are really there feels surreal — your heart beats rapidly against your chest, your hands shake with a peculiar mix of nervousness and excitement, and your stomach churns. All natural physiological responses, yet this knowledge does little to calm your racing mind. *What is he like? What should I ask? What am I even doing here?!*

Perhaps you have already guessed, but this was precisely my predicament a mere week ago. Reader, I shall end your suspense, for behind this old oak door sat the great physician and medical researcher, Thomas Addison.

For those who may be unaware, Addison has recently made the most remarkable identification of failure of the suprarenal glands, which are small triangular structures located on the top of each kidney. These glands were first identified in 1564 by Bartolomeo Eustachius; however, his discovery wasn't recognised by his contemporaries, who instead proposed that the structures were rare congenital outgrowths. Or, that they simply existed to support the nerves that

descend from the ribs to the mesentery (a tissue that supports the digestive organs in the abdominal cavity). Eventually, Eustachius' findings began to be accepted, particularly after several anatomists made the shocking discovery of a cavity within the gland filled with "black bile", which in 1836 was documented as the separation between the cortex and medulla of the suprarenal glands. Several theories pertaining to the function — if there even was any — of the suprarenal glands began to emerge. It may seem laughable now, but one such theory speculated that because the suprarenal glands seemed to appear larger during foetal development, they could serve the function of returning foetal blood to the mother's circulation for excretion. However, it wasn't until now, thanks to the diligent work of Addison, that the physiological importance of the glands has finally been recognised. This brings us back to the present.



2. Diagram of kidneys

Realising that I had begun to receive curious looks from passersby, I knocked twice before pushing the great wooden door open to reveal a rather stuffy, dimly lit room. Each wall was lined from floor to ceiling with books, occasionally broken up by oddities such as weathered skulls and jars containing an assortment of organs. The familiar scent of burning candles and old paper filled the air and I could hear the furious scribbling of pen on paper. I followed the source of the sound, leading my eyes to a desk positioned towards the back of the room. Pages upon pages of anatomical drawings and corresponding notes lay strewn across the desk, providing me a brief glimpse into Addison's mind. The man in question looked up from his work, appearing deep in thought. "You must forgive my staring" I said, slightly embarrassed as I took my seat at the desk, "It's just that I've never seen anything of the sort!". He chuckled and as my eyes finally adjusted to the light, I took note of his defined, finely proportioned features. He exuded an air of pride and confidence, yet I felt there was something else hidden behind this haughty exterior. I introduced myself and extended my arm across the desk for a handshake. His grip was strong and steady, but his eyes didn't quite meet mine and I began to sense a certain shyness about his character. As I reclined back in my seat, he offered me a cup of tea which I gratefully accepted. Addison

poured the piping hot tea from the pot as I dug out my trusty leather-bound notebook from my travel case and commenced the interview.

"Perhaps we can begin," I said tentatively, "by telling me of your early life, and what shaped the path you were to follow."

Addison gave a slight cough and leaned forward in his creaky chair.

"Well, I was born in Longbenton, Newcastle, and was fortunate enough to attend Newcastle's Royal Free Grammar School. My parents were determined to give me the greatest possible education, for which I am eternally grateful." He gazed to the side as he said this, the candles flickering and casting dramatic shadows across his face.

"Which studies particularly inspired you?" I interjected.

"Well, I found Latin challenging and rewarding– I suspect my father fancied me a career in law," he jested, "However, I had my own calling and enrolled at the University of Edinburgh Medical School in 1812. Quite a step for a young lad from Longbenton!"

It was here that Addison wrote his thesis on syphilis, with a particular focus on the use of mercury pills in its treatment. Upon graduation, he became a house surgeon at London Lock Hospital and a pupil at the Public Dispensary. A subtle sparkle appeared in Addison's deep hazel eyes as he described his work under the tutelage of dermatologist Thomas Bateman, adding that it instilled in him "a passionate and longstanding interest in diseases of the skin". His time at London Lock Hospital came to an end when he was offered a position as a physician pupil at Guy's Hospital in 1817. "How could one refuse?" he asked while laughing. Seven long years later, his licence was granted and the very same year he founded the Department of Dermatology at Guy's. Addison declared: "it was then that I knew what I must devote my life to".

3. Guy's Hospital c.1820

Addison was appointed a lecturer in 1840 and was praised for his brilliance, though he seemed hesitant to accept this idea during our interview. His cheeks slightly flushed, he confided that he suspected his colleagues found it difficult to take a liking to him. Nevertheless, his lectures always saw excellent turnout amongst medical students. Addison's principal research at the hospital surrounded pneumonia and appendicitis but his discoveries often attracted scepticism. However, earlier this year Addison published his most well-

4. Addison's post-mortem sketch of "Mr S.", taken from his 1855 monograph

known work to date, *On Disease of the Supra-renal Capsules,* cementing his space in medical research. It was this monograph that proved that the suprarenal glands do indeed serve a vital role in normal physiology. Addison leaned further forward and continued, his energy building as his speech tempo increased and his gestures became more animated. The doctor, who often spent hours at the bedside of his patients, explained that he noticed ten particular cases in which patients with anaemia had a "feebleness of the heart, irritability of the stomach, and a peculiar change of the colour in the skin occurring in connection with a diseased condition of the suprarenal capsules". In his book he states that contrary to popular belief that the suprarenal glands are innocent of any diseases, they could in fact be "affected in such a way as to produce a fatal malady". It should not be forgotten that during these studies, Addison also discovered a type of anaemia now called Addison's anaemia. Since these ground-breaking discoveries, Addison has been commended for his devotion to the diagnosis of difficult diseases and his remarkable attention to detail.

The exact physiological function of these glands remains to be determined but these findings have certainly spurred the search. Shortly after Addison's monograph was published, Alfred Vulpian, a French neurologist and physician, began investigating the function of the glands. In recent statements, Vulpian has admitted to discovering the presence of secretory granules in the suprarenal medulla — a surprising twist indeed! However, this work is yet to be published, and Addison informs me that it is likely that a great deal more research will need to be conducted in order to fully understand these intriguing glands and their associated ailments. As our conversation drew to an end, Addison withdrew back into himself, regaining a cool composure. I thanked him for his time but as I gathered my belongings he muttered, "It is really you that I should be thanking." After questioning, he confided that recent breakdowns in his health had caused him a considerable loss of excitement about his profession but that nothing soothes him better than the interest in his work shown by myself and his students. Curious, yet not wanting to press the personal matter, I expressed my gratitude once again for this opportunity and opened the great old door for a final time. It is uncertain what the

future may hold for Addison, as is ever the case, but one can be sure that his name and his work will be remembered throughout history.

Addendum

Dr Thomas Addison committed suicide on June 29, 1860, after suffering many years of melancholia. He was laid to rest at Lanercost Abbey, Cumberland.

5. Lanercost Abbey

Scientific Statement

The 'suprarenal glands' are now referred to as the adrenal glands. The adrenal glands are two endocrine organs situated on top of each kidney. They are involved in a variety of functions including stress responses, blood pressure control, and metabolism. Each gland is comprised of the adrenal cortex, which synthesises steroid hormones, and the adrenal medulla. The adrenal cortex is further divided into the zona glomerulosa (mineralocorticoid synthesis), zona fasciculata (glucocorticoids), and the zona reticularis (androgens). The adrenal medulla is involved in the production of catecholamines such as adrenaline (epinephrine).

The first accounts of adrenal insufficiency were produced by Thomas Addison who described the symptoms and the changes to the adrenal glands. While the majority of these patients had tuberculosis or tumours, one had 'idiopathic' adrenal atrophy which is now called Addison's Disease. In the modern day, the leading cause of Addison's Disease is an autoimmune condition where the immune system attacks the adrenal cortex. This is a rare disorder in which patients have antibodies against the steroidogenic enzyme 21-hydroxylase, resulting in a diminished ability to synthesise mineralocorticoids and glucocorticoids. It is thought to be caused by a complex interplay between genetic and environmental factors. Symptoms include nausea, fatigue, dizziness, and hyperpigmentation of the skin (which was noted by Addison). Patients are treated with hormone replacement therapy. If left untreated, patients may suffer acute adrenal insufficiency (or an adrenal crisis) which can be life-threatening.

Bibliography

Addison, T. (1855). *On the constitutional and local effects of disease of the supra-renal capsules*. Samuel Highley. https://addisons.org.au/wp-content/uploads/2018/12/8-Disease-of-the-Supra-renal-Capsules.pdf *(Accessed November 23, 2024)*

Al-Khanaty, A., Wells, H., Santucci, R. A., & Kim, E. H. (2025). Adrenal anatomy and physiology. *Urologic Clinics of North America, 52*(2), 169–179. https://doi.org/10.1016/j.ucl.2025.01.001

AZ Quotes. (n.d.). *Thomas Addison quotes*. AZ Quotes. https://www.azquotes.com/author/49831-Thomas_Addison *(Accessed November 22, 2024)*

Byrnes, K. G., Walsh, D., Lewton-Brain, P., McDermott, K., & Coffey, J. C. (2019). Anatomy of the mesentery: Historical development and recent advances. *Seminars in Cell & Developmental Biology, 92*, 4–11. https://doi.org/10.1016/j.semcdb.2018.10.003

Hellesen, A., Bratland, E., & Husebye, E. S. (2018). Autoimmune Addison's disease – An update on pathogenesis. *Annales d'Endocrinologie, 79*(3), 157–163. https://doi.org/10.1016/j.ando.2018.03.008

Hiatt, J. R., & Hiatt, N. (1997). The conquest of Addison's disease. *The American Journal of Surgery, 174*(3), 280–283. https://www.americanjournalofsurgery.com/article/S0002-9610(97)00136-0/abstract *(Accessed November 20, 2024)*

Miller, W. L., & White, P. C. (2022). History of adrenal research: From ancient anatomy to contemporary molecular biology. *Endocrine Reviews, 44*(1), 70–116. https://doi.org/10.1210/endrev/bnac019

Napier, C., & Pearce, S. H. S. (2012). Autoimmune Addison's disease. *La Presse Médicale, 41*(12). https://doi.org/10.1016/j.lpm.2012.09.010

Papadakis, M., & Manios, A. (2016). Landmarks in the history of adrenal surgery. *Hormones, 15*(1), 136–141. https://doi.org/10.14310/horm.2002.1612

Roberts, S. (2023, April 6). Northumbrian greats: Thomas Addison. *The Northumbrian*, (April/May 2023), 14–17. *(Accessed November 13, 2024)*

Royal College of Physicians. (n.d.). Thomas Addison. *History*, *3*, 205. https://history.rcp.ac.uk/inspiring-physicians/thomas-addison *(Accessed November 13, 2024)*

Images

Figure 1: Courtesy of the Wellcome Collection, a website operated by Wellcome Trust, a global charitable foundation based in the United Kingdom on Wikimedia Commons under an Attribution 4.0 International Deed (https://creativecommons.org/licenses/by/4.0/).

Figure 2: Reproduction from Cessarius J. Tabulae anatomicae in Papadakis (2015). Venice: Deuchinus; 1627. In public domain.

Figure 3: Picture of Guy's hospital. In public domain.

Figure 4: Taken from Addison, Thomas. On the constitutional and local effects of disease of the supra-renal capsules. 1855. In public domain.

Figure 5: Courtesy of the author.