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Journal of Skin and Sexually Transmitted Diseases

History

Gerhard Henrik Armauer Hansen – A legend

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Received : 26 April 19
Accepted : 04 May 19
Published : 02 December 19

DOI
10.25259/JSSTD_20_2019

Quick Response Code:

ABSTRACT

Gerhard Henrik Armauer Hansen radicalized the views on leprosy when he discovered the leprosy bacilli in 1873. He was a man born in a humble background but with perseverance finished medicine at the University of Christiania and later joined as assistant physician under another stalwart Danielssen at St. Jogren's Hospital, Bergen. It was here that he made the greatest discovery of his time, but it would be years before, he was truly acknowledged for his work. His theory of contagion helped in the measures to control leprosy in the form of leprosy acts. Hansen passed away in 1912, and his name remains engraved in the pages of the history of leprosy.

Keywords: Hansen, Leprosy, Mycobacterium leprae

Who discovered the leprosy bacillus? A question all of us have heard many a times during our student life. Moreover, the answer is one every undergraduate or post-graduate student has on the tip of his/her tongue. But have we ever paused to think about the unfavorable circumstances surrounding Hansen's discovery of the Mycobacterium Leprae? As I read more and more about this great man, it would be an understatement to say that I am impressed. I am in awe of one of the greatest minds of his time – a mind which had the uncanny ability to think differently, a mind which could travel in less traveled roads, and finally, a mind with enough courage to stay true to his beliefs in the face of opposition even from his near and dear ones.

Humble beginning

Gerhard Henrik Armauer Hansen was born as the eighth of fifteen children in a small town Bergen in Norway on July 29, 1841. His mother was Elizabeth Concordia Schram[1] and his father was Claus Hansen, a merchant who later faced bankruptcy.[2] Due to financial constraints, Hansen had to resort to various jobs to support his education. This included a tutor's job in a girl's school and as a substitute for prosector in anatomy at the University of Christiania (currently, University of Oslo) while studying medicine at the same institution.[1] He graduated with honors in 1866 and completed his internship at the National Hospital of Christiania. He then went on to take a post as physician at the small fishing village of Lofoten, Norway. But as destiny would have it, he returned to Bergen in 1868.[3]

His work

Norway at that time was thrashing out in the throes of leprosy (a prevalence of 2/1000), and Bergen was hit the worst (a prevalence of 25/1000).[4] Hansen first joined the hospital "*Pleiestiftelsen for*

spedalske No.1" in 1857 but later took up the post as assistant physician at St. Jogren's Hospital which was the epicenter for leprosy research then. The chief physician of this hospital was the celebrated dermatologist Daniel Cornelius Danielssen who was the final word on leprosy in Norway and even in Europe during that time.[1,3] Danielssen himself had humble beginnings born as the son of a watchmaker, apprenticed to a pharmacist at 13 years, and stricken by tuberculosis of the hip joint at a very young age. Later, he became the foremost authority on leprosy, especially after he authored a book in collaboration with another dermatologist Carl Wilhelm Boeck "*Om Spedalskhed*" [On Leprosy] in 1847. This was the first scientific work to give a detailed clinical and pathologic description of leprosy.[4] At St. Jogren's, budded a special relationship between these two stalwarts, starting off as mentor and protegee, later culminating in Hansen becoming Danielssen's son in law. Although they held fundamentally opposite views on the etiology of leprosy, Danielssen encouraged Hansen in pursuing his own line of reasoning and even prompted him to claim his rightful credit as the discoverer of the leprosy bacillus when later, a controversy ensued between Albert Neisser and Hansen regarding the same.[1,6]

Leprosy at that time in the middle of the 19th century was believed to be hereditary and both Danielssen and Boeck held this view.[5] Danielssen had a system of conducting autopsy on all leprosy patients and collecting samples.[7] Based on a study of these and his own observations while traveling around Bergen with Danielssen to collect materials from leprosy patients, Hansen on logical reasoning and epidemiological basis postulated that leprosy must be a specific disease with a specific cause. He also made use of statistics from the National Leprosy Registry. He observed that after four new leprosy hospitals were established in Bergen in 1850, there was a steady decline in the number of cases. This according to Hansen could be attributed to an increase in admissions, especially of nodular cases and hence a decrease in possible sources of leprosy thus supporting his theory of contagion. A daring speculation for a time when bacteriology was not yet a science and the concept of germs causing diseases was not even a popular one. It was in this scenario that Hansen embarked on a pursuit of the culprit.[8]

In 1869 in his publication on microscopic anatomy of lymph nodes, which won a gold medal the astute Hansen had noted yellowish brown granular masses in the lymph nodes.[2] To improve his knowledge on histopathology and thus to help improve his work on leprosy, Hansen went to Bonn and then Vienna through a scholarship provided by Danielssen.[7] On his return home, he threw himself into his work with renewed vigor. Hour after hour was spent sitting behind a microscope, noting down his observations, and eliminating other contaminant bacteria and fungi. Finally, on February 28, 1873, at the age of 32 years, Hansen discovered the leprosy bacillus in the leprous nodules dissected from the face of a boy. Hansen saw the bacilli in unstained material and later was able to stain it with osmic acid.[6] However, it was only in 1874 that he published his findings and postulated about a causal relationship between the rod-shaped bodies and leprosy.[3] It was an epoch-making discovery, and Hansen was the first in history to suggest that a chronic disease can be caused by a microbe.[2]

But instead of fame and glory what awaited Hansen were brickbats – criticism and ridicule both from his colleagues and superiors. The predominant reason was that Hansen was unable to satisfy Henle's postulates which were that microorganisms should be 1) present in all patients with the disease, 2) cultivable outside humans, and 3) able to induce a disease similar to that in humans upon inoculation into an animal.[9] Hansen inoculated rabbits, cats, monkeys, and even humans with tissues from leprous patients but yielded no fruitful results. Earlier Danielssen had tried inoculating himself, his servants, and patients but with the same results.[8] This must have been the ultimate frustration that drove Hansen to desperate measures which was to become one of the unfortunate controversies of his life.

Controversies

In 1879, Hansen was the resident physician at the leper hospital in Bergen and medical officer of health for leprosy of Norway. The same year Hansen was tried in court for attempting to inoculate the eyes of a maculoanesthetic [tuberculoid] leprosy patient from a patient with nodular leprosy [lepromatous] without her consent. The patient complained of severe pain and defective vision after the procedure. The court found Hansen guilty for failing to obtain consent from the patient and deprived him of his position as the resident physician, but he retained his position as medical officer of health for leprosy until his death.[10]

Hansen–neisser controversy

Around the same period occurred another controversy over discovery of the leprosy bacilli. In 1879, Albert Neisser, a 24-year-old microbiologist from Germany, a pupil of Koch visited Bergen to study leprosy. He returned home with samples from leprosy patients, provided by Hansen and with the help of staining techniques that were proposed by Koch and Weigert earlier, was able to successfully stain the organism. Neisser published his work claiming all credit for the discovery of leprosy bacilli. In 1879, Hansen with help from Koch had also accomplished staining of the bacilli. Again, the Norwegian Medical community rallied behind Hansen, and to defend himself, Hansen summarized his findings from 1870 to 1880 and published it in Norwegian, German, English, and French.[3,8] Subsequently, the first

International Congress held in Bergen in 1897 acknowledged Hansen as the discoverer of "Bacillus Leprae" as he called it.[11] Hansen's attempts to cultivate the bacilli in artificial media failed and this is no laughing matter when we consider that it was almost a century later (in 1960) that Shepard was able to demonstrate multiplication of *Mycobacterium leprae* in the footpad of mice.[6]

Accomplishments and accolades

Hansen acted as the president of the second International Congress held in Bergen in 1909.[13] Collaborating with the ophthalmologist, Ole Bornemann Bull, Hansen authored "*The Leprous Diseases of the Eye*" in 1873. This book was a precedent on the subject for many years.[12] Along with Carl Looft, he wrote and published a monograph on the pathophysiology and clinical aspects of leprosy.[7] Hansen penned his autobiography "*The Memories and Reflections of Dr. Gerhard Armauer Hansen*" around his 70th year.[13]

Based on his reasoning of leprosy being contagious, Hansen pulled his weight with the authorities to introduce and implement the Norwegian Leprosy Act of 1877 and its amendment in 1885. These acts advised precautionary isolation of leprosy patients with an exception for married couples who desired to live together. The act was met with much opposition but produced excellent results in decreasing the number of leprosy cases. This act later served as a model for leprosy legislation in other countries. Thus, Hansen's name is engraved in history in the field of control of leprosy.[4]

Hansen co funded an international journal of leprosy named Lepra.[2] The leprosy museum in Bergen and the Armauer Hansen building, a research facility at Haukeland, stand in lasting tribute to Hansen.[13]

Personal life

Hansen was a man with a keen sense of humor and a spirit of humility.[8] He was described as a hardworking, warm-hearted, and entertaining personality by his colleagues. In 1873, the same year as he first observed the *Mycobacterium leprae,* Hansen married Danielssen's daughter Stephanie. However, the marriage ended tragically when she succumbed to complications of pulmonary tuberculosis in October of the same year. Two years after her death in 1875, Hansen married Johanne Margarethe Gran, and in 1876, their only son Daniel Cornelius was born. The name shows Hansen's reverence to Danielssen.[7] The son pursued medicine and went on to become the chief of the tuberculosis hospital in Bergen.[1]

Other interests

Hansen was an eminent zoologist with a keen interest in the natural sciences. He was a strong advocate of Darwinism and published "*The Theory of the Descent of Man or Darwinism*" in Norwegian. He succeeded Danielssen as the head of the Bergen museum which post he filled till his death.[2] Hansen was a radical of his times with clear contempt of religion which earned him much criticism from the clergy. He was critical of women's freedom as well and doubted women's credentials to become doctors.[1]

CONCLUSION

Hansen is reputed to have suffered from syphilis and died of a heart attack on February 12, 1912, at the age of 71 years.[13]

Hansen was a man born ahead of his time. His discovery bought about the most radical change in the field of leprosy. His theories succeeded in changing the concept of leprosy from a hereditary disease or a curse of God to an infectious disease and thus offered ways and means to treat and control it. Hansen faced much ridicule, opposition, and criticism at the time of his discovery, and by calling leprosy, Hansen's disease is indeed a sign of our humble effort toward redemption.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Ghosh S, Chaudhuri S. Chronicles of Gerhard-Henrik Armauer Hansen's life and work. Indian J Dermatol 2015;60:219-21.
2. Jay V. The legacy of Armauer Hansen. Arch Pathol Lab Med 2000;124:496-7.
3. Grzybowski A, Kluxen G, Potorak K. Gerhard Henrik Armauer Hansen (1841-1912) 100 years anniversary tribute. Acta Ophthalmol 2014;92:296-300.
4. Vogelsang TM. Leprosy in Norway. Med Hist 1965;9:29-35.
5. Vogelsang TM. The termination of leprosy in Norway; an important chapter in Norwegian medical history; together with a portrait of Armauer Hansen Circa 1873. Int J Lepr 1957;25:345-50.
6. Harboe M. Armauer Hansen the man and his work. Int J Lepr Other Mycobact Dis 1973;41:417-24.
7. Grzybowski A, Sak J, Pawlikowski J, Iwanowicz-Palus G. Gerhard Henrik Armauer Hansen (1841-1912) the 100th anniversary of the death of the discoverer of *Mycobacterium leprae*. Clin Dermatol 2013;31:653-55.
8. Feldman WH. Gerhard Henrik Armauer Hansen. What did he see and when? Int J Lepr 1965;33 Suppl:412-6.
9. Irgens LM. Hansen, 150 years after his birth, the context of a medical discovery. Int J Lepr Other Mycobact Dis 1992;60:466-9.
10. Vogelsang TM. A serious sentence passed against the discoverer

of the leprosy bacillus (Gerhard Armauer HANSEN), in 1880. Med Hist 1963;7:182-6.
11. Yoshie Y. Advances in the microbiology of *M. lepra*e in the past century. Int J Lepr Other Mycobact Dis 1973;41:361-71.
12. Getz B. Leprosy research in Norway, 1850-1900. Med Hist 1958;2:65-7.
13. Tan SY, Graham C. Armauer Hansen (1841-1912): Discoverer of the cause of leprosy. Singapore Med J 2008;49:520-1.

How to cite this article: Kannan RK. Gerhard Henrik Armauer Hansen – A legend. J Skin Sex Transm Dis 2019;1(2):87-90.