Medical History

Otto Cohnheim—the forgotten physiologist

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British Medical Journal, 1978, 2, 618-619

Who was Otto Cohnheim? It is no exaggeration to say that he was the man who laid the foundation of our present understanding of the absorption of protein digestion products and also protein metabolism—yet he remains forgotten. This is largely because he unfortunately became, like so many others, a victim of political enthusiasm. 1978 is the 25th anniversary of his death, a fitting time to try to restore some of his scientific credit, which should be great, and to honour his memory. Otto Cohnheim must not be confused with his father, the eminent pathologist Julius Cohnheim, whose solemn Victorian portrait may still be seen in at least one standard textbook of pathology. Many of us may recall from our physiology books that “Cohnheim discovered erepsin”—but the discoverer of erepsin was Otto Cohnheim, not Julius.

Early achievement

Otto Cohnheim was born on 30 May 1873, in Breslau. He received his medical education in Leipzig and Heidelberg, graduating in medicine in 1896. He soon obtained the degree of MD by thesis, and was for a short time an assistant to the neurologist W H Erb. In 1897 he was appointed Privat-dozent (lecturer) in the Physiological Institute at Heidelberg, which was headed by Professor Willi Kühne, possibly best known for his work on trypsin. This appointment resulted from a paper on absorption from the stomach and intestine. Before long, Cohnheim made the major discovery of his life.¹ The idea for the research, apparently, was his own, not Kühne's. At the time, physiologists believed in the “hypothesis of resynthesis”^{2 3}—that is, that proteins were partially broken down in the digestive tract, by the successive actions of pepsin and trypsin, to “peptones,” a complex mixture of peptides. The peptones were then resynthesised to plasma proteins in the intestinal mucosa, entering the blood in this form. This hypothesis was supported by the failure to find peptones in the portal blood, and was backed by the formidable authority of the great physiological chemist Abderhalden. Cohnheim set himself the task of verifying this hypothesis. Instead, he found that extracts of the intestinal mucosa did not build up peptones into proteins—they did the opposite, breaking peptones down to free amino-acids. Cohnheim named the enzyme responsible “erepsin,” derived from a Greek word meaning “I break down” (ἐρεπίνω).

Before long he had shown that the action of erepsin was primarily intracellular, and that peptides therefore must enter

the absorptive cells. Within a few years Cohnheim's results and conclusions were generally accepted, and by 1912 it was the established view, agreed even by Abderhalden, that both free amino-acids and small peptides entered the intestinal mucosa, and that by the action of “erepsin” (now known to be a complex mixture of brush-border and intracellular peptidases) the peptides were broken down to free amino-acids, which then entered the portal blood. (In the 1920s this view

Otto Cohnheim, 1873-1953. Cohnheim is writing at his study desk at home in Hamburg. (Picture by courtesy of Mr F Kestner.)

was lost, and the heresy arose that intralumen hydrolysis to amino-acids was complete; this baseless notion, which many of us were taught as gospel in our youth, prevailed for some 50 years, and we have only recently returned to views essentially the same as those held before the first world war—but that is another story.³)

Cohnheim's work made him famous among medical scientists both in Europe and in the United States. A few years after his discovery of erepsin it was shown that all cells had the ability to break down proteins and peptides to amino-acids, and that free amino-acids were, “the protein currency of the body.”⁴ Without this realisation, further useful development of the study of protein metabolism, culminating in the discovery of the mode of protein synthesis, would have been impossible.

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Success and consolidation

For many years Cohnheim's career prospered greatly. He was promoted to *ausserordentlicher* Professor (senior lecturer) at Heidelberg, during an illness of Kühne's stood in as head of the department, and once, I am told, was considered for a full professorship of physiology in Berlin. To have gained this would have been among the highest possible honours obtainable by a physiologist in Germany at that time. He did not get the post in Berlin, but in 1913 was appointed *ordentlicher* (full) Professor at the newly founded Institute of Physiology in Hamburg. About this time, at the insistent request of his mother, he reluctantly changed his name to Kestner—a change that ultimately contributed to his dying a forgotten man. The name Kestner, which was in his mother's family, had important literary associations, occurring in Goethe's first novel, *Die Leiden des jungen Werthers*, and in a novel by Thomas Mann, *Lotte in Weimar*.

Cohnheim's career was interrupted by the Great War, in which he served as a medical officer in the field, so that it was not until 1919 that he could take up his appointment at the institute at Hamburg, of which he was made director. Cohnheim's interests were wide. He became interested in the mechanism of sugar absorption, the physiology of the kidney, general metabolism, and the physiology of marine animals; in the octopus he did some particularly ingenious experiments showing that only amino-acids were absorbed into the blood by taking advantage of the peculiar anatomy of this animal, in which the intestine is suspended in "a lake of blood." He even had an active interest in meteorology. He published many papers and books on physiological subjects (for bibliography see Matthews³ and Walter⁵). He brought up a family of four children, three girls and one boy; he travelled, researching and lecturing in Italy and the USA; he worked for a time in Russia with Pavlov. He must have led the intensely satisfying life of the successful academic. All this was to end in 1934.

End of an era

As his name suggests, Cohnheim was Jewish (though not in faith), so from the time of the accession to power of Hitler and the National Socialist Party in Germany in early 1933 his days in his post in Hamburg were inevitably numbered. His son told me an interesting story from this Nazi period. One day, two men of the Gestapo arrived at his house, with the intention of searching his study. His daughter telephoned him at his office in the institute about the arrival of these visitors. He replied, with remarkable sang-froid, that they could go ahead and search—he had nothing to hide. Nevertheless, the Gestapo men did make a find that impressed them. In Cohnheim's desk was a magnificent certificate confirming his appointment as head of his institute, signed, in reality or facsimile, by no less a man than Kaiser Wilhelm II. Seeing this, the Gestapo men fell back, as it were, and their attitude became noticeably more respectful. Evidently, even after some 15 years, the name of the Kaiser still symbolised authority.

The end came in 1934, when Cohnheim was abruptly dismissed from his post without compensation of any kind. The medical students courageously demonstrated against his dismissal, for he was a popular teacher, but of course to no purpose. Cohnheim had to sell his home and possessions, including his father's splendid library, and almost penniless escaped with his family to Britain—all this at the age of 60. To cap it all, he was interned for six months in 1940 on the Isle of Man as a potential enemy alien. But in other respects he met with help and kindness in this country. After coming to Britain he worked for a time at the Rowett Institute at Aberdeen, then directed by Boyd Orr. Then he worked at the Royal Sea-bathing Hospital at Margate, in what capacity I do not know; at this time he appears to have been working on climatological problems.⁶ In 1942, assisted by John (later Sir John) Hammond he went to Cambridge,

where he became a member of Downing College and was associated with the School of Agriculture.

There is little left to tell. In a sense, I think Cohnheim's life was ended when he had to leave Germany. Shortly, probably too shortly, after the second world war, though he had been offered a chair in Switzerland on the condition that he changed his name back to Cohnheim, he returned to his former post in Hamburg. For him Hamburg was still his home, and the name Cohnheim had come to have unpleasant associations for him. He died there in 1953, and I understand that no obituary in the English language appeared anywhere.

Recollection of a great man

I like to think of Cohnheim in his prime: a shortish, rather tubby man, successful, brilliant, brimming over with ideas, kindly, at times perhaps a little irascible—he had been known to use the phrase "that Schweinhund!" of some academic who had offended him (I wish we had that splendid epithet in the English language). I am inclined to refer to Otto Cohnheim in unfashionable terms—like his father, he was what used to be called a great man, and should be recognised as such. At the very least, he was one of the most eminent physiologists of this century. One of many instances of his kindness was told to me by Professor Necheles, once a postgraduate student of his. As Necheles said, "In those days [about 1919] the Professor was like a god: the students trembled when they saw him." One evening Necheles was working late on his research in the laboratory, tired and hungry. Times were very hard, and food was short. Cohnheim happened to look in, and he made a cup of cocoa for the young man with his own professorial hands.

In a previous publication, I showed a portrait of Cohnheim as a rather sad-looking old man nearing the end of his life. Here I show a picture of him at his desk at home in Hamburg in May 1933 (figure). I wish I could have shown you a picture from his early life as a brilliantly promising young man in the beautiful city of Heidelberg.

I am deeply indebted for help and information to Professor Joseph Fruton, of Yale University; to Professor Heinrich Necheles in California, who was a postgraduate student of Otto Cohnheim's in the difficult period in Germany following the first world war; to Mr Fritz Kestner, Cohnheim's son, who has lived for many years in England; and to Professor Horst Bickel of Heidelberg. A biographical note on Cohnheim (entry under "Kestner") has recently been published in Germany,⁵ which has also helped, and provides a few further details of Cohnheim's career. Much interesting information about Cohnheim's career at Heidelberg remains in the archives of Heidelberg University.

The laboratory work leading to my interest in Otto Cohnheim was supported by grants from the Medical Research Council of Great Britain.

References

- ¹ Cohnheim, O, *Zeitschrift für Physiologische Chemie*, 1901, **33**, 451.
- ² Matthews, D M, *Physiological Reviews*, 1975, **55**, 537.
- ³ Matthews, D M, *Gastroenterology*, 1977, **73**, 1267.
- ⁴ Fisher, R B, *Protein Metabolism*. Methuen, 1954.
- ⁵ Walter, H, *Neue Deutsche Biographie*, ed F W Euler and H Jäger-Sunstenau, vol 2, p 555. Berlin, Duncker & Humblot, 1977.

(Accepted 23 July 1978)

Should patients with rheumatoid arthritis or osteoarthritis avoid alcohol?

There is no evidence to suggest that such patients should avoid alcohol. Neither, in these groups of patients, is there any evidence that alcohol increases the risk of peptic ulceration when aspirin and other anti-inflammatory drugs are being taken.