

Sperber I. Studies on the mammalian kidney.

Zool. Bidrag Uppsala 22:249-432, 1944.

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The macroscopic anatomy of the kidney of some 150 mammalian species was examined. The nephrons and collecting ducts of about 40 species were studied mainly by the use of the maceration technique introduced by Henle. Special attention was given to the gathering of quantitative data. [This paper has been cited in over 270 publications since 1961. Based on SCI® data for 1961-82 it proved to be the most-cited paper ever published in this journal.]

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"This work, my doctoral thesis, was my first published work, and the result of investigations which lasted nearly seven years. I was lucky to be able to do so much relatively undisturbed research work during a time when most others were directly involved in the great war. I was also lucky that my teacher, N. von Hofsten, never interfered in my work and never asked when it would be ready for publication. Thus I had plenty of time for gathering data and thinking about them.

"The work developed from studies on the avian kidney (which were partly published later). The main theme is a study of the phylogenetic development of the mammalian kidney and the possibility of explaining the various kidney types on the basis of functional demands (mainly in connection with the phylogenetic trend of increasing body size). In retrospect I think that this part of the paper is both original (perhaps daring) and well thought out. However, com-

parative anatomy is a very small field today, and this part has contributed relatively few citations.

"Many more citations have undoubtedly resulted from parts of the treatise which were in a way only a by-product of the quantitative treatment which my main theme required. Thus, I found a very clear connection between the depth of the renal medulla and the hypertonicity of the urine.

"Peter¹ and Burgess et al.² had suggested that the thin segment of Henle's loop was the nephron segment responsible for the production of hypertonic urine in mammals and birds. My data showed that mammals producing strongly hypertonic urine certainly had long thin segments, but that the thick segment of Henle's loop was even better correlated with urine hypertonicity (as was also the length of medullary collecting ducts). For this and several other reasons I argued that the thin tubule could not be the place where definitive hypertonicity was achieved and suggested that the thin tubule would be a place where passive processes were preponderant.

"I think that these results were of considerable interest, and the conclusions have largely been substantiated by later work. They could perhaps have been an important stepping-stone to the deeper understanding of the function of the medulla, which we now have.

"It was, however, the brilliant hypothesis of Kuhn which gave the explanation that it is the intimate working together of the two nephron segments and the collecting ducts which results in the elaboration of strongly hypertonic urine (compare, e.g., the review by Gottschalk and Lassiter³).

"The very large volume of work which sprang from this hypothesis is undoubtedly the main reason why my thesis has been widely quoted.

"Thus, luck has been quite influential in the making of this 'bestseller,' though I like to think that merits of the work have been important too."

1. Peter K. *Die Nierenkanälchen des Menschen und einiger Säugethiere.*

Jena, Germany: Gustav Fischer Verlag, 1909. 349 p.

2. Burgess W W, Harvey A M & Marshall E K. The site of the antidiuretic action of pituitary extract.

J. Pharmacol. Exp. Ther. 49:237-46, 1933.

3. Gottschalk CW & Lassiter W E. Transport of water: renal concentrating mechanism. (Giebisch G, ed.) *Transport organs.* Berlin: Springer-Verlag, 1979. p. 449-71.