

Clermont Y & Perey B. Quantitative study of the cell population of the seminiferous tubules in immature rats. *Amer. J. Anat.* 100:241-67, 1957.
[Department of Anatomy, McGill University, Montreal, Canada]

Histological analysis of rat seminiferous tubules from birth to maturity demonstrated that gonocytes give rise to type A spermatogonia that divide to renew themselves or give rise, through intermediate steps, to spermatocytes. It was also observed that the seminiferous epithelium cycle is established as soon as type A spermatogonia initiate spermatogenesis. [The *SCI*® indicates that this paper has been cited in over 315 publications.]

Yves Clermont
Department of Anatomy
McGill University
Montreal, Quebec H3A 2B2
Canada

March 23, 1987

This investigation was initiated in the early 1950s when I was a graduate student in the Department of Anatomy at McGill University. Under the direction of C.P. Leblond, I initially analysed the formation of the carbohydrate-rich acrosomic system of spermatids in sections of adult rat testes stained with the periodic acid-Schiff technique. We had subdivided spermiogenesis into 19 steps and were using the first 14 steps to identify 14 cellular associations found in seminiferous tubule sections. These cellular associations correspond to the 14 stages of a cycle of the seminiferous epithelium.¹

Leblond and I also quantitated the spermatogonial population at the various stages of the cycle in adult rats. As a result of this work we proposed a model for the renewal of spermatogonial stem cells (type A) and the consequent production, through a series of intermediate

steps, of spermatocytes.² Subsequently it became of interest, as I wrote in a protocol dated June 1953, to "investigate the origin of the definitive spermatogonia at the time of the initiation of spermatogenesis in newborn rats."

The material for this study had been collected in 1951 but was analysed only after completion of my PhD thesis in the spring of 1953. At this point I became associated with Bernard Perey, a brilliant first-year medical student who worked with me on this project throughout the summer. All the data were collected during that summer but were prepared for publication only in 1956 after my return from a year of postdoctoral work at the Collège de France in Paris. I remained associated with Perey for years after he graduated in medicine, and we published, in collaboration with Leblond, an extensive study on the wave of the seminiferous epithelium in 1961.³ Perey is now head of the Department of Surgery at Dalhousie Medical School, Nova Scotia, Canada.

Our investigation of the testes of growing Sherman rats clarified the series of events that take place in seminiferous tubules from birth to maturity. The differentiation of gonocytes into type A spermatogonia that in turn produce type B spermatogonia and spermatocytes, as well as the transformation of small supporting cells into Sertoli cells, was carefully described, timed, and quantitatively analysed. It was also observed that the cycle of the seminiferous epithelium is established as soon as spermatogenesis is initiated.

This detailed descriptive and quantitative study was not ground-breaking, but it was a prerequisite for the clarification of the life history of germ cells and Sertoli cells in the testes of growing rats. The study was also needed to gain a clear picture of the development of seminiferous tubules in rodents. This may be why biologists working on various aspects of the testicular development in normal and experimental animals⁴ used and cited this information.

1. Leblond C P & Clermont Y. Spermiogenesis of rat, mouse, hamster and guinea pig as revealed by the "periodic acid-sulfurous acid" technique. *Amer. J. Anat.* 90:167-216, 1952. (Cited 365 times since 1955.)
2. Clermont Y & Leblond C P. Renewal of spermatogonia in the rat. *Amer. J. Anat.* 93:475-501, 1953. (Cited 110 times since 1955.)
3. Perey B, Clermont Y & Leblond C P. The wave of the seminiferous epithelium in the rat. *Amer. J. Anat.* 108:47-78, 1961. (Cited 130 times.)
4. Rich K A & de Kretser D M. Spermatogenesis and the Sertoli cell. (de Kretser D M, Burger H G & Hudson B, eds.) *Pituitary and testis: clinical and experimental studies*. New York: Springer-Verlag, 1983. p. 84-105.