Original descriptions of the relationship between epididymal function and sperm morphology

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Roussel JD, Stallcup OT, Austin CR. Selective phagocytosis of spermatozoa in the epididymis of bulls, rabits, and monkeys. Fertil Steril 1967;18(4):509-16.

"Examination of histologic sections of epididymes revealed the presence of many macrophages in the lumen of all regions, and it was often possible to discern parts of engulfed spermatozoa within the macrophages."

As readers, our academic time is so precious these days that many of our clinical journals, including *Fertility and Sterility*, understandably focus attention on human studies. However, given the obvious ethical boundaries protecting human tissue studies in the setting of male infertility, it is useful to appreciate the clinical relevance behind animal studies. Indeed, we owe much of our knowledge about sperm cryobiology to pioneering work in animal husbandry. To wit, in the summer of 1967, by utilizing a variety of animal models, Roussel et al. (1) added an important marker sign on the road to a better understanding of that deceptively simple driver of male reproductive function—the epididymis.

As practitioners who specialize in male reproductive medicine, we are used to addressing clinical scenarios that ultimately deal with epididymal function. For instance, questions dealing with the fate of sperm after vasectomy, the role of extracted epididymal sperm in assisted reproductive therapy, and finally, abnormal sperm morphology. Of course, the latter subject, teratozoospermia, may not immediately jump out to us as one dealing with epididymal function and some may conceive that problem as derived from testicular spermatogenesis. However, Roussel et al. (1) would like to gently correct our thinking on that subject.

From bulls, rabbits, and monkeys, the authors painstakingly compared ejaculated bulk semen parameters and, after the animals were sacrificed, topographical representations of sperm samples from progressively distal ductal locations along the reproductive tract. They examined the percentage of decapitated sperm in each of these samples, and found significantly less and less as the samples moved more distally toward the vasal ampulla. It appeared that the most dramatic changes occurred within the epididymis. Considering the current WHO sperm morphology assessment criteria (which encompasses no less than fifty pages in the current edition), we can be excused feeling nostalgic for a time when an experimental assessment of morphology could be based solely on the presence of a sperm head (2). Nevertheless, the authors noted a similar trend across all species examined. They verified their findings with histologic examinations revealing macrophages along the efferent duct, culling defective gametes.

While we have recently associated sperm morphology with advanced tests including DNA fragmentation and methylation patterns, this 50-year-old paper underscores the unheralded work of the epididymis in providing us with the final ejaculated morphology parameter. Prior to this manuscript, knowledge of human macrophage function within the male reproductive tract was limited to studies dealing with previously vasectomized patients. The authors successfully relied on animal models to confirm and expand

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on these findings in a non-pathological state, a feat which would be quite difficult to replicate today with human subjects. This is something we would do well to remember at a time when our attention is fixed on clinical human studies.

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