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Meiotic Studies of the Ejaculated Seminal Fluid of Humans with Normal Sperm Count and Oligospermia

So far, all known studies of human meiosis have been performed on germinal cells obtained from testicular biopsies[1,2]. As this involves a surgical procedure to obtain the material, we wish to draw attention to the statement, first made by Michael and Joel[3], that immature germ cells can regularly be seen in the seminal fluid of the human male. We have found that in smear preparations of the ejaculate of subjects with a normal sperm count, nearly 3% of the cells consist of spermatogonia, spermatocytes and spermatids (Table 1), the maximum percentage being 5%. A similar result was obtained by Heinke and Doepfmer[4]. As the sperm count decreases, however, the percentage of immature cells generally increases and, in some pathogenic cases, the percentage may be 40% or more[5]. We have characterized the cells in material in which a high percentage of the cells were immature as a preliminary to cytogenetic studies of human male meiosis.

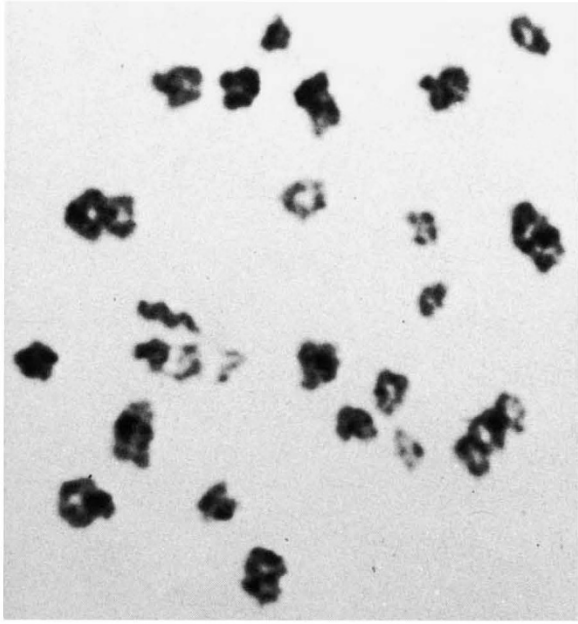

Fig. 1 Primary spermatocyte at diakinesis, from the ejaculated seminal fluid of a human male with oligospermia (×1,800).

The cells were stained for viability by the trypan-blue method[6]. In both normal and oligospermia seminal fluid, 75–85% of the cells—the viable cells—remained unstained. Furthermore, autoradiographs of spermatogonia and preleptotene spermatocytes indicated that some could incorporate tritiated thymidine. Preparations of the meiotic chromosomes in diakinesis and metaphase-I were made after hypotonic treatment by the air-dry method of Evans *et al.*[7] (Fig. 1). The best results with cells at the pachytene stage were achieved by the squash method without any pretreatment with the fixative proposed by Annerén *et al.*[8]. The relative frequency of these different stages varies in each case but leptotene and pachytene cells are predominant, possibly because of the long duration of the meiotic prophase[9]. Nevertheless, cells in diakinesis occur in oligospermia preparations and also in the ejaculate of normal males. These preliminary results suggest that the seminal fluid is a useful source of immature germ cells for cytogenetic studies of human male meiosis.

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Mandibular Gland Secretion of Larvae of the Flour Moth, *Anagasta kuehniella*, contains an Epideictic Pheromone and elicits Oviposition Movements in a Hymenopteran Parasite

Hassell and Huffaker[1] demonstrated some density-dependent regulation of numbers in populations of the flour moth, *Anagasta kuehniella* (Zeller). Fighting between newly hatched larvae[2] contributes to the regulation of numbers in this species but is not the only controlling mechanism: Smith[3] showed that crowding from the end of the first instar onwards led to delayed emergence of adults and a reduction in body weight. Since smaller moths lay few eggs[4], both these effects would contribute to the density-dependent regulation of numbers in succeeding generations. I describe here a mechanism which could bring about these effects. I suggest that last-instar larvae of *A. kuehniella*, when they meet, deposit on the substratum drops of secretion from their mandibular glands; and that the response of other last-instar larvae to this secretion results not only in the regulation of the total numbers of

Table 1 Mean Percentage of Immature Germ Cells in the Ejaculated Seminal Fluid of Human Males with Different Sperm Qualities

Sperm quality	No. of sperm (million/ml.)	No. of subjects investigated	Spermatogonia (%)	Spermatocytes (%)	Spermatids (%)	Total (%)
Normospermia	≥40	139	0.5	0.3	2.0	2.8
Oligospermia I	≥5<40	93	2.0	1.4	4.4	7.8
Oligospermia II	≥1<5	24	7.0	3.4	11.0	21.4