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TO (Name and unit) Paul Henshaw Division of Biology and Medicine Headquarters		INITIALS		
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		DATE		
FROM (Name and unit) Nell W. Fraser Radiation Sciences Br Research and Development Division, ELCO		REMARKS	REMARKS	
PHONE NO.		REMARKS	REMARKS	
DATE 9/19/66		Attached is one ^{four} copy each of three documents under contract AT(15-J)-1787, Pacific Northwest Research Foundation.		

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1190299

Timing of Human Germinal Cell Depletion Following
X-Radiation*

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We exposed the testes of normal male volunteers to single doses of ionizing radiation. 100r to 300r was sufficient radiation to cause degeneration of spermatogonia without causing damage of spermatocytes and spermatids. Thus spermatocytes and spermatids are permitted to proceed with maturation, reduction division and sperm formation in a normal fashion. Biopsies were taken at intervals during cell depletion and compared with the H^3 -thymidine biopsies of Heller and Clermont (1964). In the thymidine experiment the most advanced remaining cell was followed. After radiation the least advanced remaining cell to complete maturation to spermatozoa was the pre-leptotene spermatocyte. Following thymidine injection, the most advanced labeled cell was also the pre-leptotene spermatocyte. Maturation from a pre-leptotene spermatocyte to spermatozoa required 46 days in each instance. Thus we find from these data that following radiation the germinal epithelium denudes at the same rate as the normal germinal epithelium matures.

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KLO-1780-13

The Effect of Human Chorionic Gonadotropin on
Leydig-Cell Number and Size*

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Four normal men were given 4000 I.U. injections of human chorionic gonadotropin (HCG) three times a week for six weeks. Biopsies obtained after one and/or six weeks of treatment were compared with control biopsies using a new method for quantitating Leydig-cells. The number of Leydig-cells counted in a given area was compared to the number of Sertoli-cells in the same area, results being expressed as a ratio (Leydig-cell/Sertoli-cell). The cytoplasm, nucleus, and nucleolus were measured with a Filar ocular micrometer at 1000X. There was no statistical increase in the size of the cells after treatment. The number of Leydig-cells present during the control period is generally reflected by the control urinary testosterone values. Maddock and Nelson in 1952 (Journal of Clinical Endocrinology and Metabolism 12: 985-1011) reported an increase in Leydig-cell numbers after chorionic gonadotropin stimulation. However, in this study the Leydig-cells did not increase in number after stimulation with HCG even though urinary testosterone levels increased threefold.

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Urinary Testosterone: Index of Leydig-Cell Function*

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Combined urinary epitestosterone and testosterone have been quantitated using a gas-chromatographic method to establish an index of testicular Leydig-cell function. Data from 47 normal male subjects showed a mean daily output of 89 μ g (range 30 to 176); from 4 normal females 7 μ g/day (range 3 to 10); and from one orchiectomized subject 17 μ g/day. Stimulation of testicular steroid production with human chorionic gonadotropin (HCG) caused increases in urinary testosterone from 80 μ g/day to 247 μ g/day and with clomiphene citrate the increase is from 60 μ g to 176 μ g/day. Similar treatment of the castrate male produced no rise in testosterone excretion. Administration of a progestational agent (SC-9022) to two male subjects caused depression of testosterone levels from 98 μ g/day to 35 μ g/day. These data indicate that urinary testosterone values are a valid and useful index of testicular production of this hormone.

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