It will be seen that aerobic glycolysis is 80% of the anaerobic. Since, under careful experimental conditions, normal tissue shows high respiration and little or no aerobic glycolysis, human spermatozoa must be considered anomalous in that nearly all of the energy required for normal function is derived from glycolysis and *not* from *respiration.* This is demonstrated clearly in motility measurements made under aerobic and anaerobic conditions. Even after 10 hours in N_2, maximum motility is maintained and the glycolysis over that period, in most cases, remains linear. The same cannot be said of motility and glycolysis under aerobic conditions. Aerobic glycolysis after 3 hours tends to fall off with time and, after 3 or 4 hours, motility in O_2 shows a corresponding decrease. There are definite indications that the presence of O_2 inhibits the normal behavior of human spermatozoa.

Summary. The metabolism of human spermatozoa in Ringer-glucose is almost exclusively glycolytic and not respiratory. Aerobic lactic acid production is 80% of the anaerobic and falls off with time whereas anaerobic glycolysis is linear over a period of many hours. Maximal motility is maintained for many hours under anaerobic conditions but shows a marked tendency to decrease in air or in pure O_2. This suggests that the presence of O_2 has an inhibiting effect on the normal function of human spermatozoa.

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Relaxation of the Pelvic Ligaments of the Guinea Pig Induced by Progesterone.*

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Early in the search for the active principle of the corpus luteum, 2 methods of extraction were reported to yield substances differing somewhat in their physiological effects. The crude extracts of Corner and Allen[1] induced progestational changes in the test rabbit.

* This work was carried out at the Biological Laboratory, Cold Spring Harbor, L. I., N. Y.

† John D. Jones Scholar, the Biological Laboratory, 1939.

1 Corner, G. W., and Allen, W. M., *Am. J. Physiol.*, 1929, **88**, 326.

Hisaw and his collaborators[2, 3] described an alcohol-insoluble fraction separable from corpus luteum extracts which possessed the specific capacity of causing relaxation of the guinea pig pubis—a phenomenon which normally occurs toward the end of pregnancy. This substance was given the name "relaxin" by these investigators, who considered it to be separate and distinct from the progestational fraction which they obtained in an ether-soluble form.

A hormonal control of the pelvic changes in the guinea pig, based upon an 'estrin-relaxin' action, has been described in detail by Hisaw,[4, 5] but it would appear that the need for postulating a hormone specific for the production of pelvic relaxation should not be considered imperative until the purified hormone of the corpus luteum, progesterone,[6, 7] has been demonstrated incapable of evoking this response. With the advent of the crystalline substance the possibility of putting it to test appears, singularly enough, to have escaped attention. Accordingly, experiments were devised to determine its adequacy in fulfilling, in addition to its well demonstrated activities, the one of causing relaxation of the pelvic ligaments in the virgin female guinea pig.

Adult females, weighing 350 to 634 g, were oöphorectomized under ether anesthesia and beginning 3 to 4 days later were injected with varying dosages of estrogens,‡ followed by a course of progesterone injections, either alone or together with continued estrogen administration. Dosages and details of administration are listed in Table I, which demonstrates that in all cases in which progesterone was given, in total quantities from 0.8 to 2.2 mg, marked relaxation occurred, easily detectable on palpation.

The last 3 experimental animals listed (Nos. 8, 9, 10), which received 3 daily injections of 1000 R.U. of estradiol benzoate, followed on the third day by a single injection of 1 mg progesterone and on the fourth day by 500 R.U. of estradiol benzoate and 0.2 mg progesterone, revealed definite relaxation, although not so pronounced

2 Hisaw, F. L., Fevold, H. L., and Meyer, R. K., *Physiol. Zool.*, 1930, **3**, 135.

3 Fevold, H. L., Hisaw, F. L., and Meyer, R. K., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 604.

4 Hisaw, F. L., PROC. SOC. EXP. BIOL. AND MED., 1926, **23**, 661.

5 Hisaw, F. L., *Physiol. Zool.*, 1929, **2**, 59.

6 Fels, E., und Slotta, K. H., *Klin. Wochenschr.*, 1931, **10**, 1639.

7 Allen, W. M., *J. Biol. Chem.*, 1932, **98**, 591.

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TABLE I.
Summary of Cases of Pelvic Relaxation with Estrogen-progesterone Treatment.

Animal	Course of treatment	Results Relaxation of progesterone treatment
1	3000 R.U. estradiol benzoate per day for 4 days; 200 I.U. estrone plus 0.4 mg progesterone on 5th day; 0.4 mg progesterone on days 6 and 7	on 3rd day
2	3000 R.U. estradiol benzoate for 4 days; 200 I.U. estrone plus 0.4 mg progesterone on days 5, 6, 7	" 2nd "
3	3000 R.U. estradiol benzoate for 4 days followed by 200 I.U. estrone plus 1.4 mg progesterone on days 6 and 7	" 3rd "
4	3000 R.U. estradiol benzoate for 4 days; 200 I.U. estrone plus 0.6 mg progesterone on day 5, and 200 I.U. estrone plus 0.4 mg progesterone on days 6 and 7	" 3rd "
5	3000 R.U. estradiol benzoate for 4 days; 250 R.U. estradiol benzoate plus 0.4 mg progesterone on days 5, 6, 7	" 4th "
6	Same treatment as No. 5	" 1st "
7	3000 R.U. estradiol benzoate on 1st 4 days; 250 R.U. estradiol benzoate plus 0.4 mg progesterone on days 5 and 7	" 1st "
8	1000 R.U. estradiol benzoate for 2 days; 1000 R.U. estradiol benzoate plus 1 mg progesterone on 3rd day; 500 R.U. plus 0.2 mg progesterone on 4th day	" 2nd "
9	Same treatment as No. 8	" 2nd "
10	" " " " 8	" 2nd "
11	3000 R.U. estradiol benzoate on 1st 4 days; 250 R.U. estradiol benzoate on days 5, 6, 7	No relaxation
12	Same treatment as No. 11	" "
13	1000 R.U. estradiol benzoate for 3 days; 500 R.U. on 4th day	" "
14	Same treatment as No. 13	" "
15	" " " " 13	" "

as in those animals receiving treatment over longer periods. The optimal combination of estrogen-progesterone has not been determined. Controls, receiving estrogen alone, as the table indicates, showed no relaxation. It would appear, therefore, that the crystalline hormone, progesterone, is quite effective, when administered to the oöphorectomized and estrin-primed guinea pig, in inducing relaxation of the pelvic ligaments.