ferricyanide, or sodium pyruvate. It was concluded that isoniazid possesses only a bacteriostatic effect under these conditions.

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Exogenous Androgen and Non-Directed Hyperexcitability in Castrated Male Guinea Pig.* (20944)

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In the course of an investigation of the effects of castration and subsequent therapy with testosterone propionate‡ on the sexual behavior of the male guinea pig(1,2), a type of excited non-sexual behavior became increasingly evident. This behavior, called *non-directed hyperexcitability*, could be best described as a sudden straightening of the limbs, jumping into the air, and frequently, by turning of the head. These actions occurred suddenly and did not fit into any sequence of behavior usually seen. The excited movements seemed to occur without reference to the female or to the other behavior seen during the test.

Since this phenomenon is seen periodically in the intact guinea pig, little attention was given to it at the start of the experiment. However, as the investigation progressed it became evident that an increase in the frequency of this behavior had taken place following castration. As a result, systematic observations were not begun until after the main experiment was well underway.

Method. The procedures used in this experiment have been described(1,2). Briefly each of a group of young, mature male guinea pigs 80 to 150 days of age was isolated in an individual cage and given weekly tests in order to determine the strength of sex drive(3). Following the tenth test, all but the intact controls were castrated. After 16 weeks, during which time sexual activity fell off to a low level, all of the castrates except those used as controls were divided into evenly matched groups and given varying amounts of testosterone propionate for the remaining 15 weeks of the experiment. As indicated above, a portion of the experiment had already been completed before the present work was begun. Twenty-eight male guinea pigs of the larger group used in the original experiments contributed data to the present study; data were collected after the third week following castration. These 28 males were divided in the following manner: 2 were intact controls; 7 were given 12.5 γ testosterone propionate/

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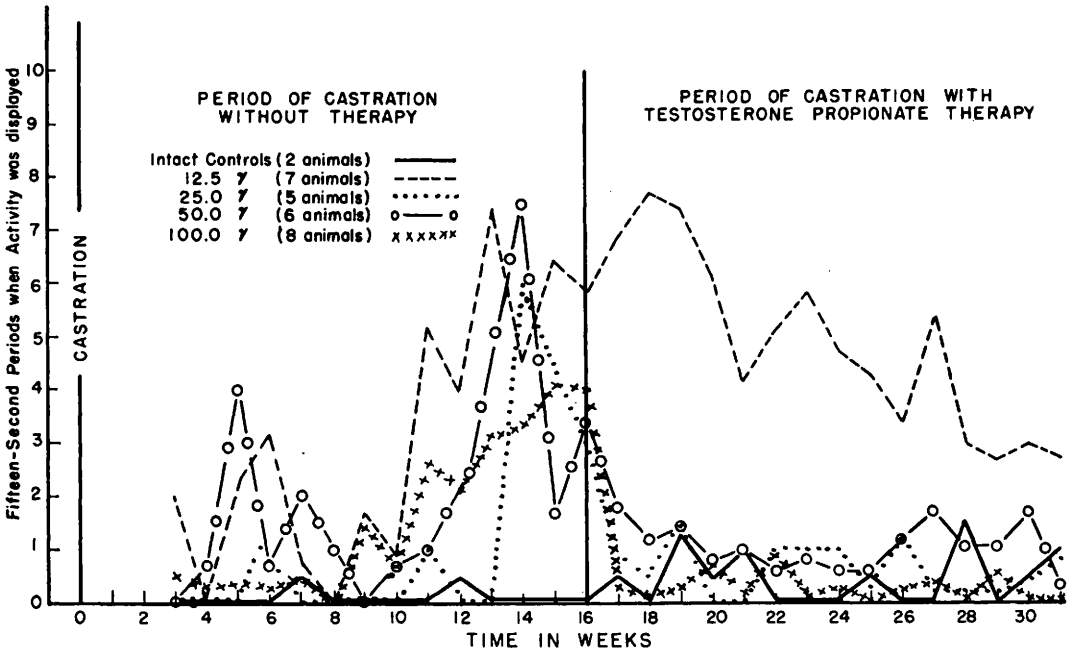

FIG. 1. Non-directed hyperexcitability of male guinea pig after castration and following androgen therapy.

100 g body weight daily starting the 17th week following castration; 5 were given 25 γ; 6 were given 50 γ; and 8 were given 100 γ of androgen. For purposes of scoring the sexual behavior, each minute of the test was divided into quarters. In the present study this approach was utilized; the number of 15-second periods in which incidents of non-directed hyperexcitability occurred were noted and were plotted in relation to time.

Results. Only infrequently during the 28 weeks in which observations were made did the intact controls display this behavior in more than one 15-second period per test (Fig. 1). In contrast, all 4 groups of castrates displayed increasing amounts of this behavior, showing it in at least four 15-second periods during tests prior to the beginning of androgen therapy.

Following the injection of testosterone propionate, 17 weeks after castration, the frequency of occurrence of the non-directed hyperexcitability decreased sharply in the groups receiving 25 γ of the androgen or more. Within a week these animals displayed this behavior at approximately the same level as the intact controls. The group given 12.5 γ testosterone propionate/100 g body weight daily differed from the others. Administration of this amount of androgen decreased the frequency of non-directed hyperexcitability to a lesser degree. Even at the end of the experiment this group displayed the behavior in an average of 2.7 15-second periods of the last test.

Discussion. What appear to be comparable data have been presented for the rat(4). Beach, using castrated male rats, injected with either estrogen or progesterone, showed that there was an inverse relationship between the amount of extra-copulatory excitement, and the vigor and frequency of masculine copulatory responses. The masculine copulatory behavior in turn was related to the levels of injected estrogen.

It appears that the behavior here described is also inversely related to the level of administered steroid; and that the administration of an amount of testosterone propionate greater than 12.5 γ/100 g body weight/day is required to prevent its abnormal manifestation.

Interestingly enough, these data coincide with those obtained for the sexual behavior

(1,2). It was shown that when 25 γ or more testosterone propionate was injected, the sexual behavior was comparable with that of the intact controls; while the group receiving 12.5 γ always had a lower drive. As in the part of the study summarized earlier it was not possible to differentiate between those animals receiving daily injections of 25, 50, or 100 γ testosterone propionate/100 g body weight.

Summary. A non-directed hyperexcitability, dependent on the level of androgen, has been described in the male guinea pig. An increase in the frequency of its occurrence took place after castration; and with the daily administration of testosterone propionate in amounts of 25 γ or more per 100 g body weight there was an immediate return to the level of the intact control. Injection of 12.5 γ of the hormone did not eliminate the increase which followed castration. The similarity of these results to other data bearing on the effect of testosterone on sexual behavior is noted.

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Effect of Quinones on Adaptive Enzyme Formation in a Strain of *Pseudomonas aeruginosa.* (20945)

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A washed suspension of a strain of *Pseudomonas aeruginosa* oxidizes benzoic acid after a latent period of 100-120 minutes(1). The latent period can be decreased and the rate of benzoate oxidation increased by the previous addition of succinate and ammonium sulfate. These effects are proportional, within limits, to the amount of succinate added(2). As a result of the oxidation of succinate, ammonia is assimilated, precursors, possibly peptides or proteins(3) are stored in the cell, and these can subsequently be utilized to form the enzyme when benzoic acid is added. It was thus possible to study the effect of a compound on enzyme formation in 2 ways provided the rate and extent of succinate oxidation is not affected. If the compound is added at the beginning with succinate and ammonia, it could increase or decrease the formation of the precursors and, if it is not metabolized, also affect the utilization of the precursors for enzyme formation. If the compound is added with the benzoate after the succinate oxidation is completed, it could only affect the utilization of precursors. The following is a study of the effect of catechol, protocatechuic acid and related compounds on the formation of the enzyme for benzoic acid.

Methods. A strain of *Pseudomonas aeruginosa* originally obtained from Dr. Koppers was grown in 100 ml of nutrient broth (Difco) for 48 hours at 37°C. The cells were centrifuged down, suspended in 50 ml distilled water, centrifuged again, and finally suspended in 7.0 ml of 0.05 M Na-K-phosphate buffer pH 7.8. 0.5 ml of this suspension was used in each Warburg vessel which had a final fluid volume of 2.0 ml. All the compounds added were dissolved in buffer and when necessary adjusted to pH 7.8. 0.2 mg of succinic acid and 0.2 mg ammonium sulfate were added to the bacteria at zero time with or without the compound to be tested and the rate and extent of the oxygen uptake measured. The succinate oxidation was usually completed in one hour. At the end of 2 hours, 1.0 mg of sodium benzoate was added from the side arm with or without the