TABLE II. Inhibition of Progesterone-Induced Ovulation in the Hen by Adrenolytic and Anticholinergic Agents.*

No. of hens	Treatment	No. of hens ovulating	% ovulating
10	Controls	9	90
10	Atropine sulfate	2	20
16	SKF-501	9	56

* All 3 groups of hens used in this experiment received 1 mg of progesterone intramuscularly.

the effect of progesterone alone, are statistically significant.

Discussion. The present results are consistent with the hypothesis established for the rat and the rabbit that a neural pathway is involved in the mechanism regulating ovulattion in the hen. Furthermore the action of atropine and SKF-501 would indicate that the neural pathway may have both an adrenergic and cholinergic link. The inhibition of both the normal and the progesterone induced ovulation by atropine and SKF-501 are identical with the results obtained in the rat(3) and the rabbit(15), and also indicate the presence of a neural factor in the mechanism that is concerned with ovulation in the hen. The present results however do not clarify the action of Nembutal with regard to its failure to prevent ovulation(9) and its ability to facilitate the process(10). Actual studies on the level of neural activity may be necessary before a definite explanation can be obtained. However, in spite of the failure of Nembutal to interfere with ovulation, these results indicate that a neural link is present in ovulation in the bird.

Summary and conclusions. Both atropine and SKF-501 block the normal occurring ovulation and the progesterone-induced ovulation in the hen. It is suggested that a neural link must be present in the mechanism regulating ovulation in the hen. This link may be similar to that postulated for the rat and the rabbit.

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Motility in a Species of Non-Flagellated Bacteria. (20677)

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Though there has been dispute concerning the role of flagella in bacterial motility, flagella have been found on most motile bacteria when examined under the electron microscope. Exceptions include members of the genera *Beggiatoa* and *Thiothrix* and of the order *Myxobacteriales,* in which creeping on a solid substrate has been described or in which flexible cell walls have been observed. In *Fusobacterium girans,* described in detail elsewhere (Macdonald)(1), motility which appears to be independent of flagella, creep-

FIG. 1. Electron micrograph of strain WT-OZ, 3-day culture on blood agar. Shadow cast with chromium . × 24000.

ing, and flexibility, has been observed in a fluid environment.

Fusobacterium girans was originally described by Prevot(2) under the name *Fusocillus girans*. Five strains were described by Macdonald(1), who proposed the inclusion of these organisms in the genus *Fusobacterium*.* Examination of these same strains in respect to their motility forms the basis for the present report. All 5 strains appeared as tapered rods and filaments of various lengths. Motility was best seen from cultures in either sheep blood agar or ascitic fluid broth, both prepared with a veal heart infusion base. Organisms examined by darkfield microscopy exhibited 3 kinds of movement: (1) a sudden lashing around a fixed pole as if one end of the cell were fixed to the slide or coverslip, (2) flexing of the cell and (3) a gliding progression through the suspending medium at rates up to about 5 μ per second. The latter type of movement was seen in only relatively short cells (up to about 10 μ in length).

Darkfield examinations failed to disclose evidence of flagella in any of the 5 strains. No turbulence in excess of normal Brownian movement was seen in particles lying in close proximity to cells exhibiting progression. Nor was there evidence of rotation around the long axis accompanying this type of motility. It appeared as a simple migration either forward or backward and was only rarely associated with slight movements of flexion.

All 5 strains were examined under the electron microscope. Cultures were chosen in which most of the cells exhibited motility (including gliding progression in the case of 3 strains). Magnifications up to 24,000 were used and several hundred cells of each strain were examined. The resolution of the electron microscope under the conditions of these experiments was approximately 40A.

In no instance were flagella found in these examinations. The presence of a slime layer was suggested in some of the photomicrographs (*e.g.* Fig. 1). In preparations from the veal heart infusion broth containing an extract

* The strains were reported to grow either anaerobically or in an environment of low oxygen tension, but not under ordinary aerobic conditions. Prolonged cultivation (more than two years) has resulted in growth on blood agar plates incubated aerobically. Motility has not been found in such cultures.

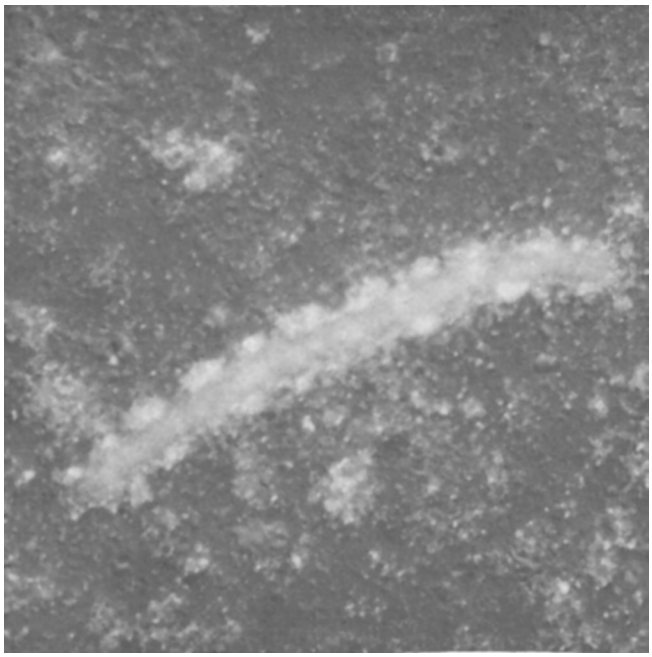

FIG. 2. Electron micrograph of strain WT-OZ, 3-day culture in broth. Shadow cast with chromium. × 12400.

of emulsified guinea pig kidney, particles frequently appeared adherent to the external surfaces of the cells as might occur if trapped in a slime layer (Fig. 2). Furthermore, India ink preparations counterstained with gentian violet disclosed ill-defined halos suggestive of a slime layer.

Examination of cultures by phase contrast microscopy and by polarized light failed to reveal any additional information. A slime layer was not visualized by these technics.

Lominski and Lendrum(3) reported the inhibition of motility in *B. proteus* and other organisms by the action of surface active agents. This effect was associated with loss of flagella attributed to either a selective lytic effect of the agents used or a failure of flagella to develop under conditions which did not favour motility. To test the effect of surface active agents on motility of *Fusobacterium girans,* 2 concentrations of each of 6 surface active agents were added to enriched veal heart infusion broth and the resultant media were inoculated with each of 5 strains of *Fusobacterium girans*. Four of the agents were anionic agents among those used by Lominski and Lendrum(3) and the dilutions used were in the range which was found by them to inhibit motility but not growth of several flagellated motile organisms (*i.e.,* sodium caprylate 1:500, 1:1000; sodium oleate 1:200, 1:400; sodium lauryl sulphate 1:2000, 1:4000; alkylated aryl sulphonate 1:2000, 1:14000). The remaining two were "Tween 20" (1:10, 1:100) and "Tween 80" (1:10, 1:100), non-ionic polyoxyethylene derivatives of sorbitan monolaurate and monooleate respectively.

In five days growth occurred only in the media containing alkylated aryl sulphonate (1:14000) and both concentrations (1:10 and 1:100) of "Tween 80". Motility was found in 4 of 5 strains in the medium containing "Tween 80" (1:10) compared to two of five strains in a control medium containing no added surface active agent. Motility in "Tween 80" (1:100) and in alkylated aryl sulphonate (1:14000) was found in only one of 5 strains. The experiment was repeated using only "Tween 80" and the control medium. The result was a finding of motility in 4 of 5 strains using "Tween 80" (1:10), 2 of 5 strains with "Tween 80" (1:100) and one of 5 strains in the control. The addition

of "Tween 80" to the medium thus had no deleterious effect on motility and in fact may have enhanced it slightly. "Tween 80" (1:10) appeared to have no effect on motility of 12-hour cultures of *E. coli, S. paratyphi B, S. dysenteriae* and *Ser. marcescens.*

The influence of antiserum on motility was examined for 3 strains. Antisera prepared in rabbits for another purpose (Macdonald)(1), were used. Growth of each strain from a 3-day culture on blood agar was emulsified on a slide with homologous antiserum, covered with a coverslip and sealed with vaseline. Control emulsions in normal serum from the same rabbits were similarly prepared. All preparations were incubated at 37°C for 30 minutes and then examined by darkfield. The numbers of motile and non-motile cells in 10 fields were counted (a total of approximately 300 to 500 cells for each preparation).

In the control preparations motility was found in about 40% of cells of strain B8-3, about 5% of cells of strain WT-OZ, and about 2% of cells of strain MU-3. In emulsions prepared with antiserum, no motility was found.

Summary. Progressive gliding motility, lashing around a fixed pole, and flexion were found in five strains of *Fusobacterium girans* when examined in fluid suspensions by dark-field microscopy. Electron, phase contrast, and polarized light microscopy failed to reveal flagella on these organisms. The presence of a slime layer was indicated by electron microscopy, and by the use of India ink preparations. Motility apparently was not affected by the addition to the medium of either "Tween 80" or alkylated aryl sulphonate. Motility was inhibited in the presence of specific antiserum. No explanation is offered for the mechanism of motility in *Fusobacterium girans.*

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Hydrodextran: Preparation, and Study on Blood Level and Excretion Rate. (20678)

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Native dextran is a long-chain glycosidic polymer of glucose produced by *Leuconostoc* fermentation of sucrose. For clinical use in blood-volume replacement, the native dextran is split by acid hydrolysis and then fractionated with methanol, to obtain shorter chain units in the range of 50-100,000 molecular weight. Each of these chains terminates in the hemiacetal group of the end-glucose unit. This reactive end-group is a possible source of destructive side reactions of dextran in solution, as pointed out by Zief and Stevens. These authors report the preparation of a hydrodextran in which the terminal hemiacetal groups are reduced to alcohol groups (4).

We have prepared a similar hydrodextran by means of high-pressure catalytic hydrogenation of clinical-fraction dextran. With the resultant modification in the terminal group of the polymer chain, it seemed possible that the mechanism of excretion from the blood stream might be different. For the blood level studies a 6% solution of hydrodextran, with 0.9% of sodium chloride, was prepared. In rabbits, and in man, it was

TABLE I.
Hydrogenation of Dextran, 12% Solution.

Analysis	Initial	Final
Viscosity, centistokes	6.65	6.22
Glucose equivalent, mg %	114	1.0