Phallus. This organ responds phenomenally to the androgen in both sexes, but is more reactive in males. Glans, corpus and crural structures are all enlarged, the organ is turgid and the posture erect. The best developed female phalli are as large as the average male, and almost indistinguishable from them.

Scrotum and pouch. These parts, to gross examination, are unmodified. The pouch in females, and the scrotal sacs in males have the same size and appearance as control specimens. The saccus vaginalis is fully formed in males and the gubernaculum properly attached, but testes are undescended, as already noted.

Summary. The administration of testosterone propionate to the pouch young of the opossum induces development of a strange medley of the characters of both sexes. On the male side the phallus, wolffian duct, epididymis, rete, and the glands of the urinogenital sinus are all stimulated, and the effect is commonly greater in males than in females. Müllerian duct derivatives are also stimulated, however, but more so in the female. Differentiation of the gonads is not profoundly affected, and scrotum and pouch are entirely unresponsive. For most structures a sex factor apparently affects the degree of the response.

10572

Demonstration of Streptococcal Fibrinolysin in Exudates. The Action of Sulfanilamide upon It.

ERWIN NETER.

From the Laboratories of the Children's Hospital, Buffalo, N. Y., and from the Department of Pathology and Bacteriology, University of Buffalo, School of Medicine.

In a preliminary note[1] it was reported that exudates of streptococcal and staphylococcal origin may exhibit fibrinolytic activity. Subsequently, a more detailed study on the occurrence *in vivo* of staphylococcal fibrinolysin was presented.[2] Recently, Tillett[3] described the presence of fibrinolysin in empyema-fluids from which *beta* hemolytic streptococci were recovered. In the following communication, observations are presented dealing with the demonstra-

[1] Neter, E., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 735.

[2] Neter, E., *J. Bact.*, 1937, **34**, 243.

[3] Tillett, W. S., *Bact. Rev.*, 1938, **2**, 161.

tion of fibrinolysin present in various exudates of *beta* hemolytic streptococcal origin and further with the action of sulfanilamide upon the fibrinolysin produced *in vivo* by this microörganism.

For the demonstration of the fibrinolysin present in exudates, the following technic was employed: The exudate was centrifuged and the supernatant fluid in serial dilutions (volume 0.5 cc) was mixed with 1 cc of 1:5 dilution of human plasma; then 0.25 cc of a 0.25% calcium-chloride solution in normal saline was added; the tubes were shaken thoroughly and incubated at 37°C. The plasma was obtained from healthy human beings by mixing 10 cc of blood with 1 cc of a 2% potassium-oxalate solution; the blood was shaken and centrifuged. Prior to the experiments the plasma was tested as to its susceptibility to the action of streptococcal fibrinolysin. The resulting coagulation of the plasma and dissolution of the clot was noted at various intervals. For the demonstration of the fibrinolysin produced *in vitro,* the supernatant fluid of an 18-hour infusion-broth culture of the respective strain was tested in like manner.

During the last 2 years, 48 specimens of purulent exudates obtained from patients with various infections due to *beta* hemolytic streptococci were tested for fibrinolytic activity. Thirty specimens were found to contain fibrinolysin, while 18 did not. These exudates included 31 empyema-fluids; 15 exhibited fibrinolytic activity, while 16 specimens failed to do so. Four peritoneal exudates were examined and 3 found to contain fibrinolysin. One pericardial exudate was fibrinolytic. Ten specimens of spinal fluid obtained from patients with *beta* hemolytic streptococcal meningitis were tested and 9 were found to exhibit fibrinolytic activity. One arthritic exudate as well as material obtained from a submandibular abscess contained fibrinolysin.

Table I presents the results of an experiment demonstrating the fibrinolytic activity of an arthritic exudate of *beta* hemolytic strep-

TABLE I.
Fibrinolysin in Arthritic Exudate Due to *Beta* Hemolytic Streptococcus.

	Amount of exudate (vol. 0.5 cc) cc	Fibrinolysis After addition of plasma and calcium-chloride solution for		
		20 min	3 hr	8 hr
1.	.5	Negative	Negative	Negative
2.	.05	"	"	Positive
3.	.005	"	Positive	"
4.	.0005	"	Negative	Negative
5.		"	"	"

Negative = No fibrinolysis (clot-formation).
Positive = Complete fibrinolysis.

tococcal origin. It is interesting to note that the undiluted exudate failed to exhibit fibrinolytic activity, while the exudate in dilutions of 1:10 and 1:100 dissolved the clot. This observation was repeatedly made on specimens of spinal fluid, empyema-fluid, and peritoneal exudate. On the other hand, other specimens showed strongest fibrinolytic activity when used undiluted. In the experiment presented in Table I, fibrinolysis occurred after 3 hours' incubation at 37°C. In tests with other exudates, fibrinolysis was observed after only one hour of incubation. This finding indicates that fibrinolysin was present in the exudate and was at least not entirely formed during possible growth of the hemolytic streptococcus in the exudate-plasma mixture. Experiments with Seitz and Berkefeld filtrates of exudates failed to yield uniform results. In 2 instances only, did the sterile filtrates exhibit fibrinolytic properties.

During the last 2 years, 5 patients with empyema due to *beta* hemolytic streptococcus were treated in this hospital with sulfanilamide and prontosil, respectively. Of these patients, 4 recovered and one died. The fibrinolytic activity of the exudates obtained at various periods prior to, and during the treatment of the patients with sulfanilamide was studied. The findings in one of these cases were as follows: On 3 consecutive days the empyema-fluid exhibited fibrinolytic activity (titer, 1:100), while subsequently fibrinolysin could no longer be demonstrated. Mention may be made that during the 9 days of observation, the cultures of the empyema-fluid revealed the presence of *beta* hemolytic streptococci. It is interesting to note that following the administration of sulfanilamide, the specimen of empyema-fluid taken on the third day of observation exhibited fibrinolytic activity in spite of the presence of 5.5 mg % of sulfanilamide in the fluid. Specimens taken later during the illness, however, lacked fibrinolytic activity; the sulfanilamide concentration in these specimens ranged from 6.7 mg % to 10.9 mg %. Whether or not the lack of fibrinolytic properties of these specimens of empyema-fluid is related to the continued administration of sulfanilamide cannot be decided at the present time. Another possible mechanism responsible for the disappearance of demonstrable fibrinolysin in exudates is the production of antifibrinolysin. Tillett[3] observed in 2 instances that at a time when the empyema-fluid, which previously had shown fibrinolytic activity, became thick with fibrin, antifibrinolytic properties were demonstrable in the blood of his patients. In the case presented above, however, the plasma (as well as the serum) of the patient lacked antifibrinolytic properties at a period when fibrinolysin was not demonstrable in the empyema fluid any longer.

It may be added in this connection that the strain of hemolytic streptococcus isolated from the empyema-fluid during the entire period of observation remained strongly fibrinolytic *in vitro,* although it had been exposed *in vivo* to sulfanilamide in concentrations of 5.5 to 10.9 mg % for 5 days.

It was observed by several authors, including Madison and Snow,[4] Huntington,[5] and Kemp,[6] that sulfanilamide failed to neutralize fibrinolysin formed *in vitro* by *beta* hemolytic streptococci. The possibility may be considered that sulfanilamide may counteract fibrinolysin that was produced *in vivo.*[7] To this end, the action of sulfanilamide upon fibrinolysin present in peritoneal exudates of mice infected with *beta* hemolytic streptococci was tested. The experiment was carried out in the following way: Decreasing amounts (volume 0.5 cc) of 0.8% sulfanilamide dissolved in physiological saline solution were mixed with 0.5 cc of a 1:10 diluted peritoneal exudate and incubated for 2 hours; then 0.2 cc of plasma, 0.3 cc of saline, and 0.25 cc of the calcium-chloride solution were added. The experiments revealed that sulfanilamide failed to retard or inhibit the fibrinolytic activity of the peritoneal exudate.

10573

Non-Effect of a High Yeast Diet on Survival of Adrenalectomized Rats.

ROSE MARRAZZI AND ROBERT GAUNT.

From the Department of Biology, Washington Square College, New York University.

Verzar[1-5] and his associates have developed a theory that the function of the adrenal cortical hormone is to maintain adequate phosphorylation processes in metabolism. One manifestation of this

4 Madison, R. R., and Snow, J. E., PROC. SOC. EXP. BIOL. AND MED., 1937, **36**, 592.

5 Huntington, R. W., PROC. SOC. EXP. BIOL. AND MED., 1938, **38**, 328.

6 Kemp, H. A., *Texas State J. Med.*, 1938, **34**, 208.

7 Neter, E., *Arch. Path.*, 1938, **26**, 1082.

1 Laszt, L., and Verzar, F., *Pflüger's Arch.*, 1935, **236**, 693.

2 Verzar, F., and Laszt, L., *Pflüger's Arch.*, 1936, **237**, 476.

3 Laszt, L., and Verzar, F., *Pflüger's Arch.*, 1937-8, **239**, 136.

4 Laszt, L., and Verzar, F., *Pflüger's Arch.*, 1937-8, **239**, 653.

5 Verzar, F., and McDougall, E. J., *Absorption from the Intestine,* Longmans, Green & Co., London.