phosphatase concentration suggesting the use of histochemical technics to evaluate steroid hormone actions on the thyroid and at the same time emphasizing the importance of the physiological state of the end organ and its effect on anticipated results.

Summary. Testosterone propionate definitely increased the cytoplasmic alkaline phosphatase in the follicular cells of the mouse thyroid when dosages of 0.5 mg or more were used. Thiouracil (0.25%) induced marked hyperplasia in 17 days and virtually eliminated the alkaline phosphatase in the follicular epithelium whereas thyroglobulin caused a follicular cell atrophy without loss of the enzyme. Testosterone propionate did not influence the thyroid alkaline phosphatase in the presence of thiouracil or thyroglobulin.

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Lysozyme Titres in Regional Enteritis, Miscellaneous Tissues, Microorganisms, and Excreta.* (17386)

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(Introduced by Karl Meyer.)

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The apparent increase in the lysozyme content of the stools in regional enteritis has already been reported.[1] At that time the proposition that lysozyme is a local initiating agent in the pathogenesis of this disease (as well as in chronic ulcerative colitis) was advanced. The circumstantial evidence supporting this conclusion was reported there and in an accompanying article discussing the probable etiologic role of lysozyme in peptic ulcer.[2]

Only 6 cases of regional enteritis were reported at that time; it therefore appears desirable to supplement this evidence with that subsequently obtained.

The values in the additional cases studied appear in the table. All were regional ileitis with involvement of varying lengths of bowel. The disease process ceased at the ileo-cecal valve in every instance. The assays were done by the viscosimetric technic of Meyer.[3]

The results were markedly uniform except for 2 low titres and one quite high one. The former were from constipated patients and the latter individual had marked diarrhea. It has already been noted that the rate of fecal expulsion influences the stool titre, particularly when the disease process does not extend to the descending colon. This depends upon the gradual inactivation of fecal lysozyme re-

TABLE I.

Case	Lysozyme concentration in units/g of stool (wet wt)	Lysozyme output per day in units
1	17.8	1,727
2	3.6	—
3	14.8	17,538
4	18.2	1,170
5	32.9	3,258
6	21.3	—
7	1.7	1,120
8	22.4	2,910
9	15.4	—
10	22.2	—
11	14.3	—
12	17.0	—
13	20.4	—
14	55.0	15,817
Means	19.8	6,220
Avg stool lysozyme values in normal individuals (1) 2.7		158
Avg stool lysozyme values in purged individuals (1) 1.6		1,064
Avg stool lysozyme values in chronic ulcerative colitis (1) 73.6		26,568

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1 Meyer, K., Gelhorn, A., Prudden, J. F., Lehman, W. L., and Steinberg, A., *Am. J. Med.*, 1948, **5**, 496.

2 Meyer, K., Prudden, J. F., Lehman, W. L., and Steinberg, A., *Am. J. Med.*, 1948, **5**, 482.

3 Meyer, K., and Hahnel, E., *J. Biol. Chem.*, 1946, **163**, 733.

TABLE II.

Specimen	Lysozyme titer in units/g or cc
1. Human fetal tissue (13 wk)	
a. whole intestine	39.8
b. thigh muscles	33.4
c. lung	13.3
d. iliac bone	25.0
e. skin	19
f. placenta	100
g. "	100
2. Dog amniotic fluid	0
3. Two full term placentas (human)	22.9 61.6
4. Endometrium (human)	
a. 14th day of cycle	8.1
b. 26th day of cycle	14.8
c. 3rd day menstrual discharge	27.8
d. bloody discharge following 4 months miscarriage	18.5
5. Nephrotic urine (normal urine—less than 1)	6
6. Pus	
a. from acute staphylococcal abscess over elbow joint	237
b. from chronic *Clostridium welchii* peritoneal abscess	80
c. from chronically infected pilonidal abscess (anerobic strep.)	280
7. Mass cultures of intestinal flora in two patients with chronic ulcerative colitis	0 ; 0
8. Stool from cases of acute gastroenteritis due to	
a. *Salmonella typhimurium*	6.3
b. Paratyphoid B	11.5
9. Paratyphoid B culture	0
10. Acute non-specific infantile diarrhea-stool	
a. 1st day of disease	125
b. 7th day of disease	5
11. Dog gastric juice	
a. under anesthesia	2.3; 1.6; 5.5
b. conscious (acidity 0/4, 0/28)	5.3; 21.3
12. Enterocystoma fluid (small bowel mesentery)	125

maining in the gut over time. It is considered that this explains the two-way variation in these 3 cases.

A comparison of these values to those previously reported in chronic ulcerative colitis, normal subjects, and normal subjects with purging shows the definite elevation of lysozyme concentration in regional enteritis. This confirms the results in the 6 cases already reported.

In addition, 3 samples of mucosa from resected segments of involved ileum were assayed. They contained 12, 66.6 and 36.2 units/g of mucosa respectively.

These data confirm the previously published impression that regional enteritis is a disease characterized by high lysozyme concentrations in the stool and in the mucosa. The mucosal assays suggest that the pathogenesis of this entity is identical with that of chronic ulcerative colitis, and that the pathological differences between them are caused by the variable response of any one tissue to injury. The cause of the localization of increased mucosal lysozyme in any one gut segment is not known.

The lysozyme titres associated with the normal gastrointestinal tract, peptic ulcer,

chronic ulcerative colitis, body fluids and secretions, hyaline cartilage, and granulation tissue have previously been reported in detail.[1-4] It is the purpose here to record additional noteworthy assays.

The results are shown in Table II.

Many of these findings cannot be discussed because of lack of knowledge concerning the physiologic role of lysozyme. Some determinations, however, deserve comment because of their relation to inflammatory intestinal disease. For example, high stool lysozyme titres apparently are not a necessary corollary to acute specific gastrointestinal inflammation (see 8 in table). On the other hand, a previously reported[1] case of acute amebic dysentery had a stool titre of 38 units/g (upper limit of normal stool lysozyme concentration is about 9 units/g). Likewise, one case of acute nonspecific diarrhea in an infant had a high stool titre which fell rapidly to normal over 7 days (see 10 in table). This case had no gross or occult blood in the stool.

The high lysozyme content of one of the 2 canine gastric juices obtained by Levine tube aspiration without anesthesia (? psychic stimulation) is of interest because a great many determinations on dog gastric juice, gastrointestinal mucosa, and stools in the absence of exciting or disturbing factors have been uniformly less than 6 units/g or cc.

The absence of any lysozyme in the mass cultures from chronic ulcerative colitis cases (see 7 in table) confirms the impression that intestinal lysozyme is not bacterial in origin.

Summary. The stools of 14 regional enteritis cases possessed a mean lysozyme content of 19.8 units per gram of stool (wet weight) and a mean daily output of 6,220 units. This is 7.34 times the mean lysozyme content of normal stools and 39.4 times the mean daily output in the stools of normal persons. These data, together with the experimental production by lysozyme of ulcerations in the canine alimentary tract,[2] indicate that lysozyme is an etiologic agent in the pathogenesis of regional enteritis.

A survey of various microorganisms, tissues, and excreta revealed generally high titres in fetal tissues and placenta, moderately high levels in endometrium with a suggestion of cyclic variation, and very large amounts in pus and in fluid from an enterocystoma. Low titres were found in the stools of two acute specific dysenteries and in canine gastric juice, with no measurable amounts in mass cultures from two chronic ulcerative colitis cases and one paratyphoid B culture. A case of acute infantile diarrhea exhibited a very high titre on the day of onset in the absence of organic pathology or specific infection, falling rapidly to normal with recovery.

It is felt that the generally high titres of fetal tissue suggest the possibility of an important role for lysozyme in the chemistry of actively growing normal tissue. The absence of lysozyme in the colitis mass stool cultures substantiates the conclusion that intestinal lysozyme is not bacterial in origin; and the moderately low levels in the specific dysentery stools indicate that acute colitis is not necessarily accompanied by a high stool lysozyme titre.

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[4] Prudden, J. F., Lane, N., and Meyer, K., to be published.

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