1. β-4-Hydroxyphenylethyl amine (Tyramine).
2. β-4-Hydroxyphenylethyl methylamine (Methyl tyramine).
3. β-4-Hydroxyphenylethyl dimethylamine (Hordenine).
4. β-4-Hydroxyphenylethyl trimethyl ammonium iodide (Hordenine methiodide).

It was noted that, contrary to the finding of Jackson and others, tyramine actively dilates constricted bronchi in suitable preparations. Methyl tyramine is equally effective both as a pressor and bronchodilator and in some cases appears to be somewhat the more active. These effects were observed with doses as low as 0.001 millimols per kilogram, injected intravenously. Equimolecular dosage of hordenine is regularly without action on blood pressure or the bronchi but 5 to 10 times this dose usually gives responses comparable to those of tyramine. Since hordenine exerts an effect similar to that of nicotine, it probably acts through a different mechanism than tyramine which has no nicotine-like action. Likewise with hordenine methiodide, nicotine-like pressor and bronchodilator effects are readily observed and this compound is about 50 times more active than hordenine itself in both its pressor and bronchodilator activities. When hordenine and hordenine methiodide are injected into unpithed animals in equally effective doses with regard to pressor effects they produce equivalent stimulation of the respiration, thereby indicating also a close similarity in their nicotine-like stimulation of the central nervous system.

From the present work there seems to be no differentiation of relative pressor and bronchodilator activities in the series of compounds here studied, although a differentiation of the mechanism by which they produce these actions is indicated by a comparison of tyramine or its methyl derivative with hordenine or its methiodide.

7141 P

Comparison of Osteogenic Power of Periosteal Transplants from Rib and Tibia.

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The object of this study was to compare the osteogenic power of periosteal transplants of the rib with those of the tibia.

Six healthy adult dogs were employed. All operations were car-

ried out with aseptic technique under ether anesthesia. In each of 3 dogs (Group I) equal-sized strips of periosteum, free from cortical bone, were removed from the mid-portion of the right 7th rib and from the middle one-third of the shaft of the right tibia. Both transplants were sutured on the external surface of the tibialis anticus muscle fascia. In each of 3 dogs (Group II) equal-sized pedicle flaps of periosteum from the rib and tibia were made. Their free ends, which were about 3 cm. long, were turned laterally and sutured on to the intercostal and tibialis anticus muscle fascia, respectively. Two of the animals in the latter group were discarded because of infection of the wounds.

Seven weeks after operation one animal of Group I was sacrificed and an autopsy was performed. In this animal microscopic examination of the transplant of periosteum from the tibia showed no evidence of osteogenesis; the transplant of periosteum from the rib, on the other hand, showed several areas with formation of new intramembranous bone. Autopsies were performed on the remaining 3 animals (2 of Group I and one of Group II) 8 months after operation. The findings in the specimens of each of these animals were essentially the same. Gross examination showed solid pieces of bone in place of each of the transplants of rib periosteum. The transplants of periosteum from the tibia felt tough and fibrous but they were pliable and showed no gross evidence of bone formation. In each case, microscopic examination of the periosteum from the rib showed well formed cortical and medullary bone, with marrow tissue and active osteogenesis especially at the periphery. The specimen of the pedicle graft of rib periosteum showed approximately 25% greater amount of new bone and also more active osteogenesis, than the specimen of free graft of rib periosteum. The grafts of periosteum of the tibia showed nothing except fibrosis of the connective tissues. In one of the latter sections there was a small amount of calcification but no evidence of ossification.

These experiments emphasize for the first time that a great difference may exist as to the osteogenic power of *periosteum* from 2 bones in the same animal. They confirm the findings (Ollier,[1] Burman,[2] Haldeman[3]) that periosteal transplants, free from adhering cortical bone, may have the power to form new bone; also, they help to explain the cause for the superiority of full-thickness grafts (cor-

[1] Ollier, L., *J. de Physiol. de l'Homme et des Animaux*, 1859, **2**, 1; 1863, **6**, 517.

[2] Burman, M. S., and Umansky, M., *J. Bone and Joint Surg.*, 1930, **12**, 579.

[3] Haldeman, K. O., *Arch. Surg.*, 1932, **24**, 440; *J. Bone and Joint Surg.*, 1933, **15**, 302.

tical bone and periosteum) of the rib as used by Eloesser,[4] Whitman,[5] Kleinberg,[6] and Bisgard.[7]

7142 C

Certain Properties of Bacterial Mucus.

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It has previously been reported that certain strains of *B. subtilis* exhibit a peculiar phenomenon when grown on saccharose agar plates.[1] The colonies are stringy and contain besides the bacteria a large amount of apparently amorphous, mucoid material. This material under appropriate conditions spreads out from the colonies on the surface of the agar for a distance of 10 to 20 mm. forming a halo around the colonies. Bacteria cannot be found in the halo and transplants made from it do not grow on the usual agar plates or in broth. However, when the amorphous substance is transplanted to saccharose agar plates it grows in tiny transparent colonies. The detailed study of this phenomenon will be described in another place[2] and only a few properties of it will be mentioned here.

It has been possible to make only 3 consecutive transfers of the amorphous substance. The bacteria are not regenerated in these cultures. In the developing colonies of the bacterium the amorphous substance usually appears first as a capsule around a few of the bacteria which often appear swollen and disintegrating. Similar phenomena, although varying quantitatively in degree, may be observed in cultures of many different types of bacteria, but are usually seen only in the first few transplants after isolation.

It is known that under certain conditions various bacteria produce large amounts of mucoid substances. "Ropy beer" is a well known example of this. This phenomenon has been attributed to an excessive production of bacterial capsules. According to our obser-

4 Eloesser, L., *Arch. Surg.*, 1920, **1**, 428.

5 Whitman, A., *Am. J. Surg.*, 1929, **6**, 801.

6 Kleinberg, S., *J. Bone and Joint Surg.*, 1929, **11**, 66.

7 Bisgard, J. D., *Arch. Surg.*, 1933, **26**, 796.

1 Dienes, L., PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 1205.

2 Dienes, L., *Zbl. f. Bakt. I. O.*, in press.