It is a pleasure to acknowledge the helpful criticism and suggestions of Dr. Evarts A. Graham during the course of these experiments.

[1] Tigerstedt, R., *Handbuch der physiologische Methodik*, 1911, Bd. II, Abt. 2, 174.

[2] Babkin, B. P., *Die äussere Sekretion der Verdauungdrüsen*, 1924, 234.

[3] Rous, P., and McMaster, P. D., *J. Exp. Med.*, 1923, xxxvii, 11.

3245

The Bactericidal Influence of Various Substances Upon Gram-Positive and Gram-Negative Bacteria.

H. A. KEMP AND MOYER S. FLEISHER.

From the Department of Bacteriology and Hygiene, St. Louis University School of Medicine, St. Louis, Mo.

We have found that ether is more rapidly bactericidal in relation to gram-negative organisms *(Escherichia coli, Eberthellia typhi, Eberthellia dysenteriae, Eberthellia paradysenteriae* (Flexner), *Alcaligines fecalis, Salmonella paratyphi, Salmonella Schotmulleri, Pseudomonas aeruginosa, Pseudomonas fluorescens, Proteus vulgaris, Serratia marcescens, Encapsulatus pneumoniae, Neisseria intracellularis)* than in relation to a number of gram-positive organisms *(Staphylococcus albus, Staphylococcus aureus, Staphylococcus tetragenus, Diplococcus pneumoniae* (Types II and III), *Streptococcus pyogenes).* It appears at present that acid fast gram-positive organisms (Mycobacteria), diphtheroids (Corynebacteria) and possibly the Lactobacilli, stand midway between the two first mentioned groups in sensitiveness to this reagent.

We further tested a number of substances containing hydrocarbon chains and possessing varying degrees of lipoid solvent activity on gram-negative and gram-positive bacteria. Our results are shown in Table I.

In general it will be seen that all of these substances act in much the same manner as does ether.

From Table II, it is seen that alkalis act as do the substances containing hydrocarbon chains, but acids act more rapidly on

TABLE I.

Bactericidal Effect of Various Substances upon Gram-positive and Gram-negative Bacteria.

Substances containing hydrocarbon chain.

Bactericidal substance		Gram-positive bacteria	Gram-negative bacteria	Lipoid solvent action
		Killed after	Killed after	
Petroleum ether	C_5H_{12}-C_6H_{14}	>4 hrs.	>4 hrs.	Good
Ligroin	C_6H_{14}-C_8H_{18}	>4 hrs.	>4 hrs.	Fair
Aniline	$C_6H_5NH_2$	5'- 10'	5'- 10'	Fair to good
Phenol, 3 per cent	C_6H_5OH	40'- 60'	20'- 30'	Fair
Cyclohexanol	$C_6H_{11}OH$	10'- 20'	2'- 10'	Good
Ethyl alcohol	C_2H_5OH	40'- 60'	10'- 20'	Poor
Glycerin	$C_3H_5(OH)_3$	>3 hrs.	>3 hrs.	Poor
Chloroform	$CHCl_3$	1'- 3'	1'	Good
Chloroform, 1 part / Ligroin, 3 parts		60'- 80'	20'- 30'	
Ethyl ether	$(C_2H_5)_2O$	40'- 50'	5'- 10'	Good
Butyl ether (secondary)	$(C_4H_9)_2O$	90'-120'	30'- 40'	Good
Diphenyl ether	$(C_6H_5)_2O$	120'-140'	100'-120'	Good
Acetone	$(CH_3)_2CO$	<1'	<1'	Good
Acetone, 1 part / Ligroin, 5 parts		40'- 60'	20'- 30'	
Ethyl acetate	$CH_3COOC_2H_5$	30'- 40'	5'	Good
Ethyl butyrate	$C_3H_8COOC_2H_5$	<2'	<2'	Good
Ethyl butyrate, 33%		30'- 60'	10'- 20'	

TABLE II.

Bactericidal Effect of Various Substances upon Gram-positive and Gram-negative Bacteria.

Acid, Alkali and Salts.

Bactericidal agent	Gram + Bacteria	Gram — Bacteria
	Killed after	Killed after
$\frac{n}{1}$ HCl	<2'	<2'
$\frac{n}{10}$ HCl	10'- 20'	30'- 90'
$\frac{n}{10}$ Acetic acid	60'- 90'	90'-150'
$\frac{n}{1}$ NaOH	2'- 5'	<2'
$\frac{n}{10}$ NaOH	40'- 50'	2'- 10'
$\frac{n}{10}$ $Ba(OH)_2$	140'-180'	90'-140'
$HgCl_2$ 1:10,000	10'- 20'	10'- 20'
$AgNO_3$ 1:100	10'- 20'	10'- 20'

gram-positive than on gram-negative organisms. Finally we tested two inorganic salts which, however, acted with about the same degree of rapidity on both types of organisms.

Our results so far do not permit of any definite explanation of these differences in the action of the various agents upon the gram positive and gram negative bacteria.

3246

Further Experimental Data on the Sympathetic Innervation and Tonus of Skeletal Muscles.

ALBERT KUNTZ AND ALVER H. KERPER.

From the St. Louis University School of Medicine, St. Louis, Mo.

In previous communications[1] we reported the results of tonus measurements carried out on the *quadriceps femoris* and *triceps brachii* muscles under normal innervation and following elimination of the sympathetic, in case of the *quadriceps femoris*, and either the sympathetic or the somatic nerve supply, in case of the *triceps brachii* muscles. The results of these measurements indicate that an important component of the tonus of a resting muscle, as manifested by the resistance it offers to passive extension, is mediated through its sympathetic innervation.

The majority of our tonus measurements, the results of which were previously reported, were carried out on cats and dogs under light ether anesthesia. In some instances measurements carried out in this manner were compared with measurements carried out on the same animal while in the waking state. In all these instances the tonus curves obtained while the animal was under light ether anesthesia were essentially similar to those obtained while the animal was in the waking state.

Nevertheless, it has been objected that even light ether anesthesia may vitiate the results of tonus measurements. In order to obviate this objection, and to secure additional checks on our previous experiments, tonus measurements were carried out on a goodly number of animals (cats and dogs) following section of the brain stem just above the midbrain. As observed by Magnus (1916),[2] the tonus of skeletal muscles is not appreciably