LETTERS TO THE EDITORS

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Physiological Action of Acetic Acid in Living Tissues

STARTING from the general thesis that volatile acids are produced in large quantity in the rumen of the sheep, McAnally and Phillipson[1] showed that some at all events of these acids are absorbed from the rumen and are found in considerably greater quantities in the blood coming from that organ and from the large intestine than in the blood coming from other parts of the alimentary canal.

They showed further that of the acids so absorbed acetic appears to be the preponderant one.

The fate of acetic acid then demands consideration. Among other possibilities is that of its being destroyed in the tissues. To test this the mammalian (rabbit's) heart was perfused with Locke's solution in which, for the glucose, sodium acetate was substituted.

As the accompanying table shows, the sodium acetate disappeared on the same sort of scale as Locke and Rosenheim[2] found glucose to be consumed.

Serial number	Weight of heart (gm.)	2-hour period	Acetate introduced at the commencement of each 2-hour period (mgm.)	Acetate disappearing in 2-hour period (mgm.)	Remarks
1	2·8	1st period	134	56	
		2nd ,,	,,	52	
		3rd ,,	,,	28	
2	5·35	1st ,,		28	Heart not beating
3	4·60	1st ,,	,,	66	
		2nd ,,	,,	54	
4	5·2	1st ,,	,,	36	1·7 mgm. acetate recovered from heart at end of exp.
		2nd ,,	,,	34	
5	4·6	1st ,,	141	54	0·8 ,, ,,
Controls in which the heart was replaced by a piece of rubber tubing.					
1	—	—	134	5	
2	—	—	134	4	

That acetate has some merit, however, under the conditions of our experiments, is shown by the fact that, whereas we have maintained the hearts beating up to 4–6 hours on solution containing acetate, on the same solutions, free of acetate, they have not beat for more than two hours.

Whether or no the acetic acid is oxidized is under investigation, but whatever its fate may be, the fact that it does disappear opens wide fields for speculation.

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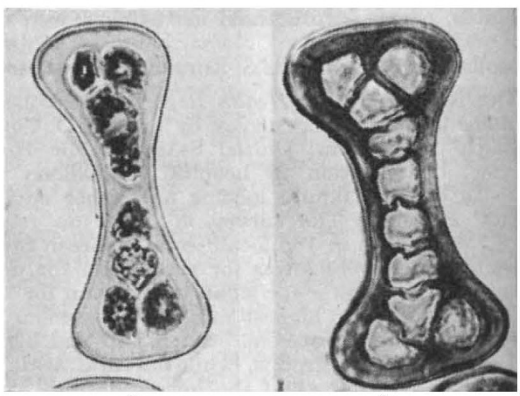
[1] McAnally, R., and Phillipson, H. T., *Proc. Physiol. Soc.*; *J. Physiol.* (in the press).
[2] Locke, F. S., and Rosenheim, O., *J. Physiol.*, **36**, 205 (1907).

Structure of Keratin Fibres

THE chief studies of keratin fibres have been carried out on wool and human hair. In these cases cortical cells constitute the bulk of the fibre substance, and readily lend themselves to physico-chemical examination[1]. The majority of mammalian fibres, however, are heavily medullated and possess a cuticular layer which may vary in thickness from 3 μ to 10 μ. A study of different types of animal fibres has shown that this histological differentiation is paralleled by chemical reactivity. The following results, obtained on treating transverse sections[2] of Kolinsky (*Mustela Siberica*) guard-hairs with various reagents, are representative of the chemical characteristics of cuticle, cortex and medulla.

Reagent	Result
5% NaOH. 2 hr. 22·2° C.	Cuticle partially attacked, complete solution of cortex, medulla undamaged.
5% $Na_2S.9H_2O$. 18 hr. 22·2° C.	Cuticle swollen and showing platelet structure, almost complete solution of cortex, medulla intact.
Chlorine water. 15 min. 22·2° C.	Cuticle very swollen and separating into platelets, cortex and medulla intact.
4*N*.HCl. 10 min. boil → 5% aq. Sod. Naphthaquinone-4-sulphonate. 18 hr. 22·2° C.	Faint colour in cuticle, very intense coloration in cortex, medulla colourless.
Millon's Mercury Reagent. 18 hr. 22·2° C.	Faint colour in cuticle and cortex, intense colour in medulla.
Van den Bergh's Diazo-Reagent. 18 hr. 22·2° C.	Faint yellow colour in cuticle and cortex, more intense colour in medulla. Colour apparently unchanged by Totani histidine test.
0·25% Trypsin. *p*H 8·5. 35° C.	Complete solution of medulla after 15 min., cuticle and cortex intact after 3 weeks' treatment.

It will be noticed that sodium hydroxide and sodium sulphide, reagents which cause fission of the disulphide bond[1], are most reactive with those parts of the fibre which the Sullivan test shows contain the greater proportion of cystine. The major portion of reactive tyrosine is located in the medulla region.



a *b*

(×560)

Fig. 1.

When transverse sections of guard-hairs from the Russian hare (*Lepus variabilis*) are dyed in neutral or acid solutions of basic dyes, the dye is absorbed preferentially by the medulla. Uniform dyeing results from an alkaline bath. Acid dyes in neutral solution dye only the cortex, but in acid solution dye both cortex and medulla. Fig. 1 shows the