avons vérifié que l'emploi d'un milieu dépourvu de sulfate n'entraîne point une diminution de l'activité des cultures anaérobies, ce qui exclut la possibilité que la formation de l'enzyme soit induite par l'ion $SO_4^=$ analogue structural de l'ion $S_2O_3^=$. Il est d'autre part peu vraisemblable qu'une substance organique soufrée présente dans les produits Difco soit douée d'une fonction inductrice. Nous sommes donc amenés à considérer que la thiosulfate-réductase de *P. vulgaris* est probablement de nature constitutive. Le fait saillant qui ressort de nos résultats est l'inactivité complète des extraits de cultures aérobies. Un certain nombre d'expériences complémentaires ont été réalisées en vue d'expliquer cette dernière observation. En face d'une telle situation, on peut toujours envisager *a priori* l'éventualité d'une inactivation irréversible de l'enzyme au contact de l'oxygène. Toutefois dans le cas présent, celle-ci doit être écartée puisque l'aération pendant 5 h d'un extrait de culture anaérobie n'exerce aucune influence sur son activité. D'autre part, l'addition d'un extrait de culture aérobie ne modifie point l'activité d'un extrait de culture anaérobie, ce qui conduit au rejet de l'hypothèse suivant laquelle les bactéries formeraient en aérobiose un inhibiteur de la réductase. En définitive une seule possibilité demeure: l'oxygène réprime la formation de l'enzyme dans les cultures aérobies. On ne se trouve point là en présence d'un cas isolé puisque la nitrate-réductase d'*Aerobacter aerogenes*[5,6], la nitrite-réductase[7] et l'oxyde nitreux-réductase[8] de *Micrococcus denitrificans*, ne sont pas synthétisées en aérobiose. Une idée générale se dégage de notre présent travail et de nos recherches antérieures: les réductases bactériennes dont la fonction physiologique essentielle est de permettre l'utilisation de nombreux composés oxygénés du soufre et de l'azote comme accepteurs d'hydrogène, sont soumises à l'action répressive de l'oxygène atmosphérique.

Influence des conditions de croissance sur l'activité thiosulfate-réductase des extraits

	Cultures anaérobies		Cultures aérobies	
	avec $S_2O_3^=$	sans $S_2O_3^=$	avec $S_2O_3^=$	sans $S_2O_3^=$
$^{-}Q_{H_2}$	1950	1390	0	0
	3400	1250	0	0
N	87	62	0	0
	152	56	0	0

On donne dans chaque cas les résultats de deux expériences distinctes. N représente le nombre d'unités d'enzyme par mg d'azote protéique.

Summary. The extracts obtained from aerobic cultures of *Proteus vulgaris* are completely without thiosulfate reductase activity. This phenomenon can be explained by the repression of biosynthesis of the enzyme by oxygen.

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[5] F. PICHINOTY et L. D'ORNANO, Biochim. biophys. Acta *48*, 218 (1961).
[6] F. PICHINOTY et L. D'ORNANO, Nature *191*, 879 (1961).
[7] F. PICHINOTY et L. D'ORNANO, Biochim. biophys. Acta *52*, 386 (1961).
[8] F. PICHINOTY et L. D'ORNANO, Ann. Inst. Pasteur *101*, 418 (1961).

The Mode of Action of Pilocarpine on the Resistance of the Chamber Angle of the Primate Eye[1]

The therapeutic effect of pilocarpine in chronic simple glaucoma is due to its ability to reduce the outflow resistance through the chamber angle in many cases of glaucoma. A similar effect is obtained also in the normal eye. It is a widely held belief (see LEYDHECKER[2] for references) that this action is due to the muscarinic effect of pilocarpine on the ciliary muscle. Contraction of the muscle is thought to affect the trabecular meshwork. The following experiments performed in the monkey, *Cercopithecus aethiops* (green vervet), indicate that this view has to be modified. They show that atropine quickly abolishes the pilocarpine-induced spasm of the ciliary muscle without reversing the effect on outflow resistance at the same time.

Methods. Adult monkeys were anaesthetized with intravenous pentobarbital. Refraction was determined by retinoscopy. Outflow resistance was studied by infusing 5 µl/min of 0.9% NaCl into the anterior chamber and recording the pressure by means of a strain-gauge transducer. Infusion was by motor-driven syringe. Injections into the anterior chamber were by a micrometric syringe connected to a side arm of the needle in the anterior chamber.

Results. Figure 1 demonstrates that 0.2 mg pilocarpine HCl placed on the cornea 1 h before the experiment reduces the outflow resistance: the pressure rise on infusion on the treated side is somewhat less than half that on the control side. The experiment is typical, the average resistance on the treated side was 48% of that on the control side (range 24–70%, 6 animals).

Figure 2 shows the effect of injecting 1 mg/kg atropine sulphate i.v. over 30 sec on refraction in similarly pilocarpine-treated eyes and on intra-ocular pressure during continuous infusion of 5 µl/min of saline into pilocarpine-treated and control eyes. At this rate of infusion into the anterior chamber, pressure changes are mainly due to resistance changes.

The refraction data were obtained from 8 different monkeys, one contributing both eyes at 5 days interval. Experimental values for each eye were plotted and values for whole minutes derived by interpolation. The curve shows the average of these interpolated values. Refraction '0' has arbitrarily been assigned to the asymptote. The initial degree of myopia could only be measured with great difficulty due to the miosis and the values are uncertain. Readings were obtained in 4 cases, they were −4, −4, −6, and −8 diopters. As a rule the pupil widened within 1 min after the atropine and, as the curve shows, accomodation relaxed within 3–5 min.

[1] This investigation was supported by P.H.S. grant B-3060 from the U.S. National Institute of Neurological Diseases and Blindness.
[2] W. LEYDHECKER, *Glaukom, ein Handbuch* (Springer 1960).

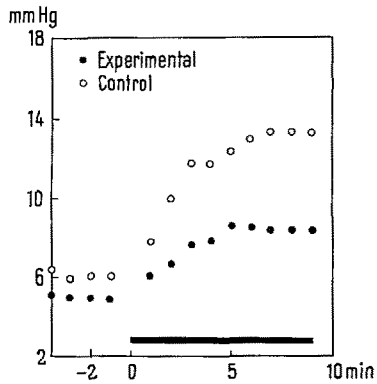

Fig. 1. Vervet 4.6 kg. 0.2 mg pilocarpine HCl in 0.01 ml placed on cornea of experimental eye at —60 min. The black bar indicates period of infusion of 5 µl/min into both eyes simultaneously.

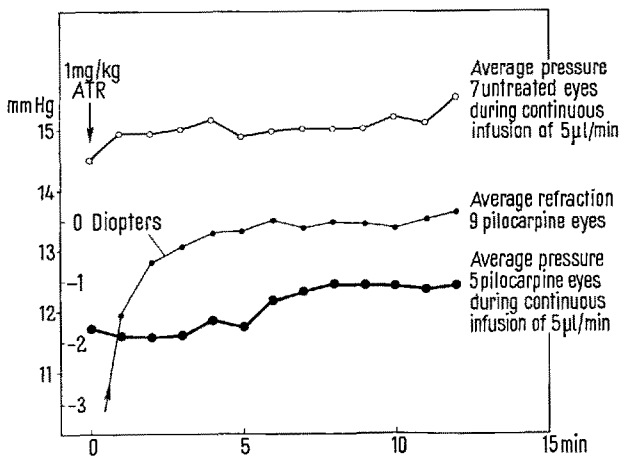

Fig. 2. Rapid disappearance of myopia but only small increase in resistance after 1 mg/kg atropine sulphate i.v. in vervet eyes treated with 0.2 mg/cornea of pilocarpine HCl.

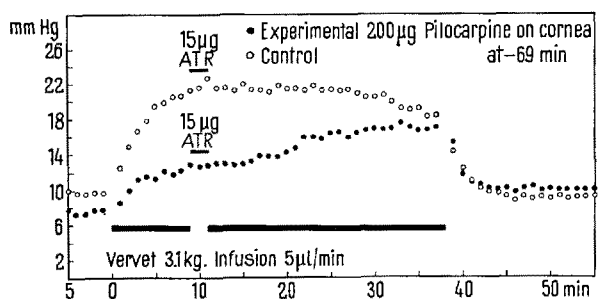

Fig. 3. Slow effect of 15 µg atropine sulphate injected into the anterior chamber of both eyes on resistance of pilocarpine-treated eye.

The topmost curve of Figure 2 was obtained from 7 other monkeys. These eyes had not received any treatment except the topical lidocaine for cannulation. It is seen that the normal eye does not change its resistance noticeably despite the sudden cycloplegia.

The lowermost curve represents 5 eyes in 5 monkeys. Four of them had received 0.2 mg and one 0.3 mg pilocarpine HCl on the cornea 1 h before the experiment. In 4 of them retinoscopy was successful on the contralateral, non-cannulated eye during the pressure recording and these values are included in the average refraction curve. It is seen that there is only a small pressure rise as accomodation relaxes. The main part of the pressure difference between the two groups of eyes remains. If the pilocarpine effect had been due to ciliary muscle spasm, the pressure in the treated eyes would have started to rise towards the level of the control eyes as soon as the spasm was abolished.

Figure 3 shows that, even if a large dose of atropine is injected directly into the anterior chamber, the pilocarpine effect disappears only very slowly. This was so in 3 of 8 eyes while in 3 other eyes recovery was only moderately slow.

The main point of attack of pilocarpine in the normal primate eye thus cannot be the ciliary muscle, as far as the resistance-lowering effect is concerned. Probably the alkaloid acts directly or indirectly on the endothelial cells of the trabecular meshwork. Since the effect of pilocarpine is about the same (expressed in inverse resistance units) in normal eyes as in chronic simple glaucoma, it is probable that also the therapeutic effect in most cases is due to an action on the meshwork endothelium[3].

Zusammenfassung. Mit Pilocarpin herabgesetzter Widerstand des Kammerwinkels des Meerkatzenauges wird durch Atropin viel langsamer aufgehoben als die entsprechend induzierte Ciliarmuskelkontraktion. Dieser Pilocarpineffekt dürfte daher auf einer direkten oder indirekten Beeinflussung des Endothels des Trabekelsystems beruhen.

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Unterschiedliche Empfindlichkeit verschiedener Angiotensinderivate gegen Abbau durch Plasma oder Nierenhomogenat

Das blutdrucksteigernde Oktapeptid Angiotensin mit der Struktur Asp-Arg-Val-Tyr-Val-His-Pro-Phe wird *in vivo* durch verschiedene Peptidasen im Blut und Gewebe abgebaut[1–3]. Die Angiotensin-abbauenden Fermente werden üblicherweise unter dem Sammelbegriff «Angiotensinase» zusammengefasst, ohne dass eine Substratspezifität nachgewiesen ist. Ebensowenig ist bekannt, ob Veränderungen des Angiotensinmoleküls die Empfindlichkeit gegenüber «Angiotensinase» verändern können. RINIKER und SCHWYZER[4] haben neuerdings Angiotensine

[1] E. BRAUN-MENENDEZ, J. C. FASCIOLO, L. F. LELOIR, J. M. MUNOZ und A. C. TAQUINI, *Renal Hypertension* (CH. C. THOMAS, Springfield, Ill. 1946).
[2] I. H. PAGE und F. M. BUMPUS, Physiol. Rev. *41*, 331 (1961).
[3] R. SCHWYZER und H. TURRIAN, Vitamines and Hormones *18*, 237 (1960).
[4] B. RINIKER, H. BRUNNER und R. SCHWYZER, Angew. Chemie *74*, 469 (1962).