any significant extent, as the BUdR incorporated into the embryonic DNA on the day of treatment is expected to be subjected to the diluting effects of the subsequent divisions. Even if the modified form of the DNA existed in the treated embryos only for a limited period, it would affect the genes functional within that specified time span, as BUdR is demonstrated to disturb transcriptional process[8,18]. Such an effect, in turn, would influence every subsequent step in embryonic differentiation which, as described by Weintraub et al.[19], is temporally organized and 'involves the synchronous activity of a multitude of events'. Therefore, the decreased transcriptional activity observed in BUdR treated embryos could be the end result of a disturbance at one point in a system, the regulation of which rests upon interdependency of genes acting in sequence.

The disappearance of the 25S RNA which seems to be a normal compliment of the transcriptional products of 11-day-old embryos, in BUdR treated specimens also could be considered as a consequence of the disturbance described above. The absence of this RNA species in the experimental embryos might have been caused through the functional failure of the respective cistron or anomalous RNA processing which have been reported to occur following exposure of mammalian cells to other halogenated pyrimidines[20].

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Lethal effect of tetracycline on tsetse flies following damage to bacterioid symbionts

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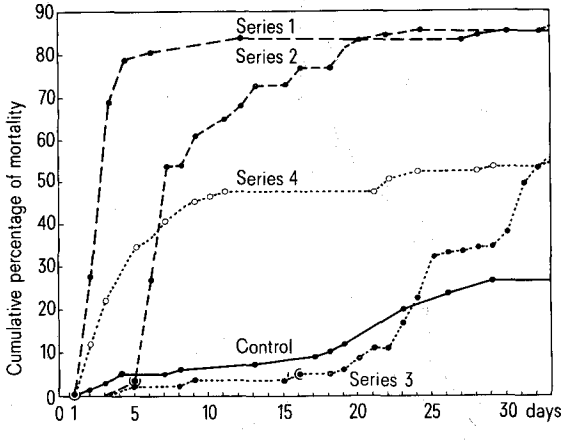
Summary. High mortality was observed in tsetse flies, Glossina morsitans morsitans, that had had a single blood meal on rabbits which had previously been administered tetracycline complex salts. The death of the flies was apparently effected by the killing of the fly symbionts and the destruction of the mycetomes of the gut. It is suggested that tetracycline complex salts in the food or drink of livestock may be tried for the control of tsetse flies.

Insects which are haematophagous throughout their lives, probably obtain essential vitamins from their symbiotic microorganisms[2]. It has been suggested that this dependence could be used for control by the elimination of the symbionts[3]. The bacterioid symbionts of Glossina are intracellular rodshaped organisms, located in a specialized cell group in the gut – the mycetome[4,5]. In the present report, tetracycline complexes were found to kill the symbionts and destroy the mycetomes of the gut of G. morsitans prior to the death of the flies. It is proposed that the flies died because of the accumulation of dead symbionts or direct poisonous effect of the tetracycline and not because of vitamin deficiency. Chlortetracycline has previously been used to obtain symbiont-free Glossina[6] without causing extensive death among the flies.



The cumulative mortality in Glossina morsitans series following a tetracycline containing rabbit-blood meal. The day of treatment is marked by a circle (same circle for series 1 and 4). Series 1–3 injected intraperitoneally; series 4 treated p.o.

Materials and methods. Glossina morsitans morsitans (Machado), obtained as pupae from the Tsetse Research Laboratory, Langford, Bristol, were maintained (up to 40 flies of mixed sexes to a cage) at 26 °C and 70% relative humidity. They were fed on rabbits on alternate days, starting on the first day after eclosion. Flies that refused to feed were discarded. The experiments consisted of a single tetracycline-containing blood meal given to series of Glossina 1 h after the drug had been administered to the rabbits. Other meals and the control feedings were on untreated rabbits. Tetracycline was injected i.p. or perorally to rabbits that had been starved for 24 h. The i.p. injections were given through a plastic tube that had been inserted through a small peritoneal incision, each time 24 h before injection. The tetracyclines used were the complex salt of oxytetracycline (Pfizer Italiana S. p. A., Italy) or chlortetracycline (American Cyanamid Co., Pearl River, N.Y.). 150 mg of the drug were mixed with 50 mg magnesium sulfate in 5 ml water, stirred slowly overnight at room temperature and injected i.p. at a dose of 50 mg tetracycline per kg rabbit body weight. 'Terra-

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mycin' syrup (Pfizer Italiana, S. p. A., Italy) was used for oral administration in doses containing 75 mg oxytetracycline activity per kg rabbit weight.

Results and discussion. The figure summarizes the various feeding experiments. Flies of series 1, first fed on an i.p.-injected rabbit, were affected within a few hours. Of the 103 flies (4 replicates), 11 were moribund 3–5 h after engorgement, and 70 flies were dead within 48 h. A less drastic effect was observed in series 2 (55 flies), treated on the fifth day of their lives; only 2 died on the day of treatment. In older flies, the reaction of the drug was much more delayed and moderate. In series 3 (85 flies in 3 replicates), the rise in the rate of mortality that followed treatment on the 15th day was slow, reaching the total of 49 dead flies 17 days later. The mortality in all three series was much higher than that of controls (95, 3 replicates, $p < 0.005$ calculated for day 5 of series 1, day 7 series 2 and day 17 after treatment for series 3). Because of lower absorption and partial excretion of the drug following oral administration, flies of series 4, fed one day after eclosion, reacted less incisively than series 1 (96 in 4 replicates; 46 dead by day 10, $p < 0.005$). Pupae, progeny of the fed flies, were collected and were found to be of low vitality. Only 17% of 71 lived for more than a single week. (No normal control pupae were collected for comparison.) Flies moribund following treatment and untreated flies were examined histologically. Most of the mycetome cells in treated flies were full of dead, elongate and dark brown, bacterioids, in sharp contrast to the blue staining (in Mayer's haemalum) of all the bacterioids in control flies. The affected mycetomes were markedly vacuolated and in different stages of disintegration. The borders of the gut were disrupted both towards the lumen and the haemocel. Brown bacterioids were also dispersed in the haemocel. These histological observations indicate that death of the flies was apparently effected by destruction of the mycetome system, although a direct toxic effect of the tetracycline cannot be excluded.

It has been suggested that sulfaquinoxaline, which impairs the fecundity of tsetse flies, could be considered for control of tsetse flies in the wild[8,9]. The results of laboratory experiments presented here show that the tetracyclines should also be viewed as potential tools for this control. The drug could be added to the fodder or drinking water of domestic animals. It is nonpoisonous and should, in the right dosage, kill tsetse flies selectively and quickly.

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Effect of L-amino-ethyl-cysteine, a sulfur analogue of L-lysine, on virus multiplication in mammalian cell cultures[1]

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Summary. L-amino-ethyl-cysteine clearly inhibits replication of Mengovirus; another RNA-virus (vesicular stomatitis virus) is completely insensitive. Protein synthesis is not impaired, but no active viral RNA-polymerase is detected.

In previous studies, we have looked for the action of a 4-sulfur analogue of L-lysine (AEC) on the metabolism of mammalian cell cultures[2]. In this paper we report the effects of AEC on the replication cycle of Mengovirus.

Materials and methods. L929 cells were grown at 37 °C in Eagle's minimal essential medium (MEM) containing 8% of calf serum (CS). Mengovirus and Vesicular Stomatitis Virus (VSV) were replicated on L929 cells. Titers of stocks viruses: Mengovirus, 3.8×10^9 PFU/ml; VSV, 2.7×10^9 PFU/ml. [^{3}H]-Uridine (specific activity 27 Ci/mmole) and [^{14}C]-protein hydrolysate (specific activity 50 mCi/matom) were obtained from the Radiochemical Centre, Amersham. Actinomycin D was purchased from Sigma. S-(β-aminoethyl)-L-cysteine HCl was synthesized through the condensation of L-cysteine and β-bromoethylamine by the method of Cavallini et al.[3]

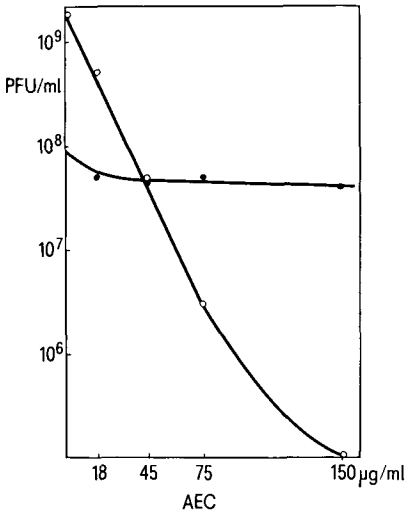

Fig. 1. Replication of Mengovirus (○) and VSV (●) in presence of AEC.

Results. 1. Dose-response curve. Barely confluent monolayer of L cells in 60 mm plastic dishes were treated with different concentrations of AEC 24 h before infection. After removal of the media, cultures were infected with Mengovirus (30 PFU/cell). After incubation for 1 h at 37 °C, the monolayers were carefully washed 3 times with PBS. 5 ml of fresh medium containing the appropriate amount of AEC were added to each plastic dishes and incubation at 37 °C was continued for 24 h. The cultures were frozen and thawed 4 times to release the intracellular virus, and after low-speed centrifugation the virus in the clarified supernatants was titrated by a plaque assay.

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