addition to the tetramere ε_4 (ref. 10). The results of quantitative analysis by starch gel electrophoresis and quantitative estimation of the total embryonic haemoglobin by starch block electrophoresis are given in Table 1. The amounts of fractions 1 and 3 were calculated from starch gel by comparison with known haemoglobin concentrations. The production of adult haemoglobin starts towards the end of pregnancy. No foetal haemoglobin is present 10–12 weeks after birth.

Table 1. QUANTITATIVE AND QUALITATIVE DISTRIBUTION OF EMBRYONIC HAEMOGLOBINS

Crown-rump length (cm)	Number of embryonic haemoglobin fractions	Embryonic Hb as per cent of total pigment	Per cent of total embryonic Hb in fraction 1	2	3
0·5	2	≈100		90	10
1·0	3	90	20	60	10
1·5	3	75·5	10	60	5
3·0	2	30·0	5	25	—
3·8	2	13·0	2	11	—
3·9	2	13·0	2	11	—
4·2	2	6·0	1	5	—
5·2	2	3·0	0·5	2·5	—
6·0	2	2·0	0·5	1·5	—
7·0	2	2·0			
8·0	1	Traces			

These results are interesting from the point of view of comparative physiology. The main point to emerge is that in cattle embryos, as in human embryos, prefoetal haemoglobins develop before the foetal blood pigment is formed. It is worth mentioning that foetal haemoglobin cannot be found in early embryonic stages (0·5 cm).

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PHARMACOLOGY

Antibacterial Effect of Fisetin and Fisetinidin

THE antibacterial effect of numerous bioflavonoids is not yet known, and on the basis of chemical structure it seemed worth while to investigate the possible antibacterial effect of fisetin, dihydrofisetin and fisetinidin chloride. Fisetin and dihydrofisetin are commercial products, but we have synthesized fisetinidin chloride. Fisetin is found in *Butea frondosa*, *Gleditschia triacanthos*, *Quebracho colorado* and the genus *Rhus*[1,2].

We used the agar plate method and found that fisetin does not influence the growth of *Escherichia coli*, and only affects that of *Proteus vulgaris* and *Pseudomonas aeruginosa* when applied in amounts of 500 μg. The growth of *Staphylococcus albus resistens*, *Staphylococcus aureus resistens* and *B. subtilis* ATCC 6633 is inhibited by doses of 100 μg of fisetin and the growth of *Candida albicans* is inhibited by doses of 300 μg. We found that fisetinidin, in doses of 100 μg, inhibits the growth of *Staphylococcus albus*, *S. aureus*, *B. subtilis* ATCC 6633 and *Candida albicans* and that of *Proteus vulgaris* when doses of 200 μg are given. Fisetinidin is not able to influence the growth of *Escherichia coli* or *Pseudomonas aeruginosa*. Following the application of 50–500 μg of dihydrofisetin, dihydroquercetin and quercetin, no antibacterial effect was observed on any strain.

Drops of suspensions of *S. albus* and *S. aureus* (Buttle) strains were placed in test-tubes containing liquid broth media (Lab. Lemco) from broth cultures 18 h old. After 18 h incubation in the Lab. Lemco broth media, fisetin at a concentration of 10 μg/ml. completely inhibited *S. albus* and in a concentration of 40 μg/ml. inhibited *S. aureus* (Buttle). If bouillon is used 40 μg/ml. of fisetin exerts a bacteriostatic effect on the *S. albus* and 50 μg/ml. of this drug has the same effect on *S. aureus* (Buttle). To achieve a similar effect with fisetinidin a concentration of 40 μg/ml. was needed. Table 1 demonstrates the bactericidal effect of these substances.

Table 1. BACTERICIDAL EFFECT OF FISETIN AND FISETINIDIN

	Lab. Lemco		Bouillon	
	S. albus resist.	*S. aureus* (Buttle)	*S. albus resist.*	*S. aureus* (Buttle)
Fisetin	50 μg/ml.	40 μg/ml.	50 μg/ml.	50 μg/ml.
Fisetinidin	50 μg/ml.	40 μg/ml.	40 μg/ml.	40 μg/ml.

With respect to chemical structure it is worth noting that the antibacterial effect of fisetin disappears when the double bond between the second and third carbon atoms is removed; dihydrofisetin proved to be quite ineffective as an antibacterial agent. The difference between fisetin and quercetin, which is also inactive, is merely that the quercetin does not contain a hydroxyl radical on the fifth carbon atom.

Our investigations show that fisetin and fisetinidin chloride can be ranged among the bioflavonoids having the strongest antibacterial effect so far observed.

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Pyrantel Tartrate, a New Anthelmintic Effective against Infections of Domestic Animals

THIS communication reports the discovery of a new series of highly active anthelmintic compounds which exhibit a broad spectrum of activity against both adult and immature worm infections of domestic animals. One of them, pyrantel tartrate (Fig. 1, V), has undergone extensive field evaluation.

These substances were first tested for anthelmintic activity against *Nematospiroides dubius* in mice and *Nippostrongylus muris* in rats. Compounds (I)—(VI) were among the most active to emerge from these tests, and their potency increased roughly in that order. They have all been evaluated in sheep. It was found that the structure–activity relationships were similar to those found in the primary screen particularly in respect of *Nippostrongylus muris*.

Trans 1-methyl 1,4,5,6-tetrahydro-2-[2-(thienyl)vinyl-] pyrimidine (V) as the tartrate salt, administered as a single oral dose of 25 mg/kg, exhibits a high level of activity against adult and immature *Haemonchus*, *Oster-*