to ammonia in the presence of either partially reduced substrate amounts of benzyl viologen or reduced triphosphopyridine nucleotide and catalytic amounts of this dye.

We wish to report that nitrite can be reduced in the light by spinach grana in the presence of chloroplast extract. The broken chloroplasts and the chloroplast extract were prepared as described by Whatley *et al.*¹¹. Table 1 shows the result of an experiment in which the electrons were supplied (via the non-cyclic electron flow of the bacterial type) by the ascorbate-dichlorophenol indophenol system after blocking by heating the first light reaction^{1,2}. No nitrite reduction occurs in the absence of chloroplast extract or when it is previously boiled. The chloroplast extract catalyses also the dark reduction of nitrite with reduced triphosphopyridine nucleotide^{10,12}, or with hydrogen and bacterial hydrogenase⁶.

Our results indicate that the spinach chloroplasts contain the enzyme(s) which allow them to use nitrite as terminal electron acceptor in a kind of non-cyclic photophosphorylation. It may be suggested that ferredoxin is the primary physiological electron acceptor replaced by benzyl viologen in Hageman *et al.*¹⁰ experiments. It has been reported^{10,13} that the reduction of nitrite is rapid in light but proceeds very slowly in darkness. Thus, nitrite reduction can be considered as one of the most simple and typical examples of photosynthesis, together with the photoproduction of hydrogen and the photofixation of nitrogen². We are now trying to fractionate the chloroplast extract in order to identify the individual steps involved in nitrite reduction.

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PHYSIOLOGY

Water Content of Rat Foetal Tissues following Administration of Water to the Dam

THE work of Moschia, Battaglia and Barron¹ has shown that the placenta, like other tissues, is relatively freely permeable to the passage of water. Dancis, Worth and Schneidau² have also found, by artificially modifying the osmotic pressure of the blood of pregnant rabbits, that water was transferred across the placenta at such a rate that osmolality of the foetal and maternal blood was reached in an hour.

In the light of this, a similar investigation has been carried out on the rat, and a comparison of the distribution of excess water in the skin, blood, brain and skeletal muscle made between the foetus and dam.

Wistar and Sprague-Dawley rats weighing 300–400 g in the last two days of pregnancy were used. Initially, the age of the foetus was ascertained by the results of vaginal smearing, but with experience the size and age of the foetuses could be accurately gauged by palpating the dam.

The pregnant rats were divided into two series. In the test group each animal was anaesthetized by ether, and a small polythene cannula of internal diameter 0.5 mm was inserted into the right external jugular vein for a distance of 5 mm. The cannula was attached to a hypodermic syringe by means of an adaptor. 50 ml/kg of distilled water was infused into each animal over a period of 10 min. After 1 h, during which time the animal regained consciousness, the animal was again anaesthetized and a sample of blood taken by tail prick for haematocrit. The adult was then killed by exsanguination, the foetuses removed and a blood sample for haematocrit taken from one foetus. Samples of shaved skin, striated muscle and forebrain were taken from both the adult and foetuses for water content estimation. These were carried out by drying the fresh, unfixed tissue at 110° C until constant weight was attained.

The control animals received no treatment, and were merely anaesthetized, and samples of tissue taken from adults and foetuses as in the test group.

Table 1. MEAN WATER CONTENT (ML. WATER/G WET WEIGHT) OF TISSUES AND HAEMATOCRIT OF ADULT RATS 1 h AFTER INTRAVENOUS ADMINISTRATION OF 50 ML/KG WATER COMPARED WITH UNTREATED ANIMALS (*P* CALCULATED FROM *t*-TEST)

Forebrain		Skin		Muscle		Blood	
Control	Test	Control	Test	Control	Test	Control	Test
78.79 <i>n</i> = 6	79.08 <i>n</i> = 8	54.89 <i>n</i> = 7	56.32 <i>n</i> = 8	75.86 <i>n</i> = 7	77.52 <i>n</i> = 8	33.91 <i>n</i> = 15	29.05 <i>n</i> = 8
<i>P</i> = 0.5–0.1		<i>P</i> = 0.5–0.1		<i>P</i> = 0.02–0.01		<i>P</i> = 0.01	

Table 2. MEAN WATER CONTENT (ML. WATER/G WET WEIGHT) OF TISSUES AND HAEMATOCRIT OF RAT FETUSES 1 h AFTER INTRAVENOUS ADMINISTRATION OF 50 ML/KG WATER TO THE DAM, COMPARED WITH CONTROL FETUSES (*P* CALCULATED FROM *t*-TEST)

Forebrain		Skin		Muscle		Blood	
Control	Test	Control	Test	Control	Test	Control	Test
88.17 <i>n</i> = 6	88.63 <i>n</i> = 8	88.92 <i>n</i> = 6	89.32 <i>n</i> = 7	89.4 <i>n</i> = 5	91.95 <i>n</i> = 8	35.59 <i>n</i> = 15	38.88 <i>n</i> = 8
<i>P</i> = 0.5–0.1		<i>P</i> = 0.1–0.05		<i>P</i> = 0.5–0.1		<i>P</i> = 0.02–0.01	

In the pregnant adult (Table 1) intravenous administration of 50 ml/kg of water resulted in an increase in water content of forebrain, skin and muscle and in a drop in haematocrit. The last two changes were significant.

In the foetus (Table 2) water administration to the dam was followed by a significant increase in water content of skin. The magnitude of this change in foetal muscle was not significant and there was no measurable differences between water content of the brain of test and control animals (the accuracy of the dry weight estimation being ± 0.5 per cent). The haematocrit of the test foetuses, however, showed a markedly significant rise (*P* = 0.02–0.01).

These results suggest that even though water may freely pass through the placenta, the distribution in the foetus is not uniform. While the foetal brain shows no propensity to overhydration, other tissues such as skin and possibly muscle take up the excess water. The increase in haematocrit cannot at present be explained, but work is now in progress on the possibility of a reciprocal relationship between overhydration of the blood and amniotic fluid.

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