



RATE OF HAEMOGLOBIN SYNTHESIS AFTER BLOOD LOSS
IN THE SHEEP. INFLUENCE OF DIETARY PROTEIN.

By

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The research reported in this thesis was carried out at the Commonwealth Scientific and Industrial Research Organisation, Division of Animal Physiology, Ian Clunies Ross Animal Research Laboratory, Prospect, N.S.W. The Department of Biochemistry of the University of Adelaide was associated with the work, and the thesis was submitted to the University of Adelaide for the degree of Master of Science.

October, 1965.

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SUMMARY

Experiments have been carried out to determine the capacity of the sheep to synthesize haemoglobin and the effect of dietary protein intake on the rate of haemoglobin synthesis.

An effect of intravenous adrenalin on jugular haemoglobin concentration was measured, and a good agreement was found between the Evans-blue method of determining blood volume and the ^{51}Cr -tagged red cells method of estimating blood volume.

Splenectomized sheep responded to single massive bleeding and prolonged daily bleeding with an increase in the rate of haemoglobin synthesis and in the retention of dietary nitrogen.

In intact sheep a moderate degree of experimental anaemia (6 gm Hb%) maintained by daily bleeding provoked a marked increase in the rate of haemoglobin synthesis. The maximum rate of haemoglobin synthesis achieved was about $3\frac{1}{2}$ x the normal rate which was equivalent to the production of 0.25 gm Hb/day/kg body weight. Haemoglobin concentration was maintained at 6 gm Hb% partly at the expense of the reserve haemoglobin in the spleen. Haemodilution was observed during bleeding followed by a haemoconcentration during the recovery period.

Comparison of the rate of haemoglobin synthesis on two levels of protein intake (65 gm and 145 gm crude protein per sheep per day) suggested that the rate of haemoglobin synthesis was independent of dietary intake within the limits examined, but the level of the circulating mass of haemoglobin after recovery from

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bleeding was probably influenced by the protein intake.

The implications of the results from these experiments are discussed in relation to the factors which influence the rate of haemoglobin synthesis.

Preface

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and to the best of the author's knowledge contains no published or written material from another person, except where due reference has been made in the text.

