Five myeloma proteins of the Ge group, three of which are shown in Table 1, were negative for all the Gm characters. These myeloma proteins were found to show a unique fast mobility for the F component produced by papain splitting not found with other myeloma proteins[2]. This suggests a considerable degree of individuality for this class of protein although they still cross-reacted in the F fragments with myeloma proteins of the other groups.

In addition to the Ge group, the Gm(*b*–) members of the Vi group, and the rare member of the We group, a number of other myeloma proteins were encountered which were also (*a*–*b*–*f*–). Two of these are shown at the bottom of Table 1. Most antisera showed these myelomas to be deficient but as yet no antiserum has been obtained which recognizes them in a positive fashion. Evidence also was obtained indicating that this was not a homogeneous group but consisted of a mixture of types.

Experiments on the distribution of the various groups among the molecules of normal γ-globulin indicate that they in general parallel the incidence among myeloma proteins. Quantitative precipitin analysis on twenty normal sera indicates a range for the Vi type protein from 0·1 to 1·1 mg/c.c. (ref. 2). A counterpart for the Ge group was also found and this occurred at a lower level. All sera examined, including those from whites of different Gm phenotype, negroes, Chinese and American Indians contained the Vi, We and Ge type proteins.

It has been thought in the past that genes Gm^a and Gm^b are alleles in Caucasians[10]. Certain unusual features, however, have been encountered in other racial groups[13,14]. The results presented here showed that types Gm(*a*+) and Gm(*b*+) did not occur in the same group of 7*S* γ-globulins. All Gm(*a*+) and Gm(*f*+) myeloma proteins fell into the We group which, furthermore, did not include any Gm(*b*+) proteins. It is known that the distribution of Gm(*b*) and of Gm(*f*) is very similar in Caucasians, because white individuals are, with rare exceptions, positive for both or for neither[8,9]. Combining these results, it seems possible that Gm^f (certainly not Gm^b) may be the true allele of Gm^a. It is then a reasonable concept that the 'We locus' (with Gm^a and possibly Gm^f as major alleles) and the 'Vi locus' (with Gm^b and at least one unknown allele) are closely linked. Reasoning along these lines leads to the prediction that Gm(*b*–) γ-globulins of the Vi group contain the product of the true allele(s) of Gm^b and that genes at a third locus, the 'Ge locus', as well as other loci, determine characteristics of the *H* chains of other 7*S* γ-globulin molecules.

We thank Dr. R. Bachmann, Dr. C.-B. Laurell and Dr. U. Nilsson, of the Department of Clinical Chemistry, Malmö General Hospital, for certain of the myeloma sera and myeloma fractions.

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PHARMACOLOGY

Transfer of Oxytocin from the Maternal to the Fœtal Circulation in the Ewe

LITTLE is known of the transfer of peptides between the maternal and fœtal circulation. In their exhaustive review, Hagermann and Villee[1] mention the results of the work of Krzysztoporski[2], who showed that simple peptides cross the placental barrier, and those of Knobil and Josimovitch[3] that insulin crosses the mono-layered placenta of the rat. Other information on the placental penetration of peptide hormones is sparse and contradictory. High concentrations of oxytocin in maternal blood during parturition have been reported[4] and it seemed therefore of interest to investigate the possibility that oxytocin in the maternal circulation might reach the fœtus.

Table 1. OXYTOCIC ACTIVITY IN FŒTAL LAMB PLASMA BEFORE AND AFTER INJECTION OF OXYTOCIN INTO THE MATERNAL UTERINE ARTERY

Ewe No.	Days before full term	Dose of oxytocin (units)	Interval between oxytocin injection and starting collection of blood sample (seconds)	Oxytocic activity of plasma extracts mU/ml. blood: Control	After oxytocin injection
1	25	40	10	3·0	3·0
2	17	40	90	2·3	3·4
3	17	40	90	3·3	6·0
4	16	20	90	1·2	2·7

The experiments were carried out in pregnant ewes of the Welsh breed, in which the dates of conception were known. The ovine placenta is cotyledonary and has five layers, the fœtal and maternal circulations coming into juxtaposition in the cotyledons. About 20 days before term, the lamb or lambs were removed from the uterus by Caesarian section under spinal nerve block anæsthesia with the umbilical cord intact. (The operations were kindly carried out by Prof. Messervy and his staff.) Control samples of about 20 ml. of blood were withdrawn from the umbilical artery into heparinized syringes. Oxytocin (20–40 units 'Syntocinon', Sandoz) was injected into the uterine artery of the ewe, and a second sample of arterial blood withdrawn from the cord either before or after the oxytocin-induced contraction of the uterus. After centrifugation at 0° C the plasma was separated and extracted by treatment with acetone and ether according to the method of Ginsburg and Smith[5]. Oxytocic activity in the extracts was assayed on the superfused rat uterus[6] using 'Syntocinon' as standard. The results are shown in Table 1. Oxytocic activities equivalent to 1·2–3·3 mU oxytocin/ml. were found in control plasmas. In one experiment the second sample of umbilical arterial blood was collected 10 sec after the injection of oxytocin and before the uterus contracted; there was no difference in the oxytocic activity of the plasma before and after injection. In the remaining three experiments, in which the second samples were collected 90 sec after oxytocin injection when the uterine contraction was apparently maximal, the oxytocic activity of the second plasmas was 50–125 per cent greater than that of the controls. Treatment of the extract of the second sample of plasma in experiment 3 with thioglycollate[7] reduced the oxytocic activity from 6 mU/ml. to 3 mU/ml. blood, that is, to the level found in the control sample. It seems likely that the oxytocic activity in the control sample was due to the presence of kinins in the extract[8] but that the additional activity after injection was due to oxytocin, suggesting that the placental barrier is not impermeable to oxytocin.

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