affecting the maturation or migration of cells into functional compartments. The possibilities and limitations of tritiated thymidine for further studies are discussed.

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*DIFFERENCE IN ELECTRIC POTENTIAL ACROSS THE PLACENTA OF GOATS**

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The data presented in this report were obtained during part of an investigation[1] directed primarily to study the "forces" that determine the net transfer of water across the placenta from the maternal to the fetal blood and the mechanisms that regulate the water content of the fetus and the surrounding cavities. To learn whether electro-osmotic phenomena operate in the process of transfer of water across the placenta, we have proceeded to determine whether or not any difference in electric potential exists across the barrier that separates the maternal from the fetal blood.

The animals used for the experiments were goats (duration of pregnancy 145–47 days), bred on known dates. The heparinized mother was under spinal anesthesia (Pontocain) and received, in addition, a light dose of thiopental sodium (Pentothal)

intravenously. Polyethylene tubes, filled with an isotonic solution of NaCl, were introduced into a maternal femoral artery and a maternal jugular vein and in one, sometimes two, small branches of the umbilical vessels. A polyethylene tube was introduced at the same time into the allantoic cavity by passing it through the uterine wall. The difference in potential between any pair of such catheters was measured by dipping their free ends into two beakers filled with isotonic NaCl in which the tips of two calomel electrodes were immersed. The calomel electrodes were connected to a Beckman pH meter, Model G. As was to be expected, no appreciable difference in potential could be measured between the femoral artery and the jugular vein of the mother. Similarly, on the fetal side, no difference in potential was detectable between the fetal vessels. In all cases a considerable difference in potential existed between the maternal and the fetal blood streams, and in every case the fetus was negative with respect to the mother (see Table 1).

TABLE 1

DIFFERENCE IN POTENTIAL BETWEEN MATERNAL AND FETAL BLOODS

Fetal Age (Days)	Millivolts
79	+133
85	+ 90
90	+100
96	+100
105	+115
110	+ 55
110	+ 70
111	+ 85
119	+ 50
131	+ 25

If the data are tabulated according to fetal age, as in Table 1, it becomes apparent that, under the experimental conditions in which we measured it, the difference in potential was greater in the younger fetuses. In some experiments a small incision was made through the uterine muscle, to expose the outer face of the chorion, and the tip of a polyethylene tube filled with isotonic NaCl solution was pressed against the surface of the chorionic membrane. The difference in potential between this catheter and a catheter placed beneath the chorion, either in the allantois or in a fetal vessel, was of the same sign and magnitude as that measured between the fetal and maternal bloods. Thus the chorionic membrane appears to be the source of the electromotive force that creates the difference in potential across the placenta.

At present we are inclined to think that the recorded difference in potential is the electric manifestation of an active transfer of ions across the placenta. This hypothesis is based upon an analogy with other biological systems that have been more thoroughly investigated, as, for example, the skin and the gastric mucosa of the frog.[2] In addition, the available experimental evidence tends to indicate that some ions—for example, the amino acids of the maternal plasma[3]—are actively transferred from the mother to the fetus.

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ERRATA: The Formation of Antibodies in Man after Injection of Pneumococcal Polysaccharides by Michael Heidelberger.

In the article of the foregoing title appearing in these PROCEEDINGS, **43**, p. 884, Table 1 should appear as follows:

TABLE 1

MICROGRAMS OF TYPE-SPECIFIC ANTIBODY NITROGEN PER 4 ML. OF SERUM FROM ALL SUBJECTS ALL TYPES INJECTED, 3 WEEKS TO $5^1/_2$ MONTHS AFTER INJECTION OF 1–6 POLYSACCHARIDES

μG. ANTIBODY N/4 ML SERUM	S I		S II		S III		S V		S VII		S VII	
	113 *	%	80	%	33	%	96	%	48	%	34	%
0–10	31	27	16	20	12	36	69	72	7	15	17	50
11–20	31	27	19	24	7	21	13	14	9	19	8	24
21–30	18	16	17	21	8	24	5	5	6	13	4	12
31–40	10	9	11	14	0	0	5	5	7	15	1	3
41–50	5	4	4	5	2	6	1	1	1	6	2	6
51–60	5	4	0	0	1	3	1	1	3	6	1	3
61–70	1	1	6	7	0	0	0	0	5	10	0	0
71–80	2	2	1	1	1	3	0	0	2	4	0	0
81–90	1	1	3	4	0	0	0	0	0	0	0	0
91–100	1	1	0	0	2	6	0	0	1	2	1	3
101–200	6	5	2	3	..	..	2	2	5	10	..	..
>200	2	2	1	1	..	..	..	..	..	..	..	..

* No. of subjects.