

LETTERS TO THE EDITORS

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ABO Blood Groups and Sex-Ratio at Birth in Man

SEX-RATIO at birth in man and some other organisms has been a subject of investigation for several decades. No clear evidence has been available indicating its association with any known hereditary trait. The purpose of this note is to point out such an association of sex-ratio with ABO blood groups in man. The data consist of ABO determinations of 1,330 mothers and cord blood of their newborn infants, delivered during the second half of 1944, at the Nowrosjee Wadia Maternity Hospital in Bombay. The original purpose of that investigation was to study the frequency of sub-groups of A in the sample of mothers¹ and the incidence of hæmolytic anæmias in their newborn infants^{2,3}. Recently there was occasion to re-examine the data for ABO determinations and sex-ratio in infants. Results of this analysis are given in Table 1.

Table 1. ABO BLOOD GROUPS OF INFANTS CLASSIFIED ACCORDING TO SEX AND BLOOD GROUPS OF THEIR MOTHERS (BOMBAY)

Infant		Mother				Total
Group	Sex	O	A	B	AB	
O	Male	158	46	53	—	257
	Female	103	42	44	—	189
A	Male	50	108	20	16	194
	Female	55	109	15	16	195
B	Male	45	23	124	25	217
	Female	33	24	91	18	166
AB	Male	—	19	25	14	58
	Female	—	22	21	11	54
Total	Male	253	196	222	55	726
	Female	191	197	171	45	604

In this table, figures in the three classes, namely, O infants born to O mothers, A infants born to A mothers, and B infants born to B mothers, are large enough for further consideration. There is a significant difference ($\chi^2 = 5.57, P < 0.02$) in the sex-ratio (percentage of males) of O infants born to O mothers (60.5 ± 3.0) and the sex-ratio of A infants born to A mothers (49.8 ± 3.4). The sex-ratio of B infants born to B mothers (57.7 ± 3.4) is similar to the sex-ratio of O infants born to O mothers. The overall sex-ratio is 54.6 ± 1.4 .

It was thought necessary to check this finding with data from some independent source. At the Presbyterian Hospital, New York, ABO determinations have been made as a routine, mostly of Rh-negative mothers and their newborn infants, for the past few years. Analyses of the data collected since January 1949 are given in Table 2.

There is a similar difference ($\chi^2 = 4.93, P < 0.05$) in the New York data to that found in the Bombay data, in the sex-ratio of O infants born to O mothers (56.3 ± 3.0) and the sex-ratio of A infants born to A mothers (45.7 ± 3.7). The overall sex-ratio in New York data is 52.7 ± 1.7 .

It would be difficult to speculate how general is the trend shown in Bombay and New York data. Such a difference could arise by differential mortality during the prenatal period, or differential gametic fertilization or both. Differential mortality, if it exists, would not be explained only in terms of the

Table 2. ABO BLOOD GROUPS OF INFANTS CLASSIFIED ACCORDING TO SEX AND BLOOD GROUPS OF THEIR MOTHERS (NEW YORK)

Infant		Mother				Total
Group	Sex	O	A	B	AB	
O	Male	153	45	21	1*	220
	Female	119	54	21	—	194
A	Male	55	85	6	9	155
	Female	51	101	6	3	161
B	Male	21	7	29	7	64
	Female	23	4	15	4	46
AB	Male	—	9	4	4	17
	Female	—	2	4	2	8
Total	Male	229	146	60	21	456
	Female	193	161	46	9	409

* Exception to Bernstein's theory of ABO heredity.

process of isoimmunization due to A and B antigens, as the notable differences in the sex-ratio are found in combinations where mother and her newborn infant belong to the same ABO blood group. A detailed account of this finding with some related evidence will be published elsewhere.

I am grateful to Dr. V. R. Khanolkar for technical facilities at the Tata Memorial Hospital, Bombay. I am also grateful to Prof. Leslie C. Dunn, of Columbia University, and Dr. Richard L. Day, of the Presbyterian Hospital, New York, for consultation and encouragement. Information collected at the Presbyterian Hospital by Dr. John L. Scudder was kindly placed at my disposal by Dr. Day.

L. D. SANGHVI

Columbia University,
New York City.
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¹ Sanghvi, L. D., *Proc. Ind. Acad. Sci.*, **22**, 208 (1945).

² Khanolkar, V. R., and Sanghvi, L. D., *Nature*, **155**, 427 (1945).

³ Sanghvi, L. D., and Khanolkar, V. R., *Ind. J. Med. Sci.*, **1**, 45 (1947).

Discovery of the Expected Hæmagglutinin, Anti-Fyb

THE hæmagglutinin described in this note was found in the serum of Mrs. Hahn, of Berlin, following the birth of her third child.

The mother gave no history of blood transfusion. Neither her two previous children, nor the third, showed any signs of hæmolytic disease of the newborn, though the first died at the age of two months of a nutritional disorder. She was delivered of her third child, a female, at the Wenckebach Hospital, Berlin Tempelhof, by Dr. Haacke, and the abnormal antibody was discovered two days after delivery in the course of the routine examination of all post-natal maternal sera, carried out at the Robert Koch Institute.

The antibody was found to have a titre of 16,000 when tested against the red cells of both the husband and of the new-born child, suspended in gelatin solution. Against a number of specimens of group O cells suspended in saline the titre was 16. The serum was next tested in Berlin against the blood of seven persons whose red cells had previously been tested for nearly all known antigens. The antigen defined by the new antibody was present in six of these bloods, and did not correspond to any for which they had previously been tested. The serum was further tested in London against a larger panel of red cells. It was observed that reactions were stronger in albumin than in saline, and stronger at 37° C. than at room temperature. Again, no correspondence was