GENETICS

Primary Embryonal Sex Ratio in Normal Pregnancies determined by the Nuclear Chromatin

MANY attempts have been made to establish a sex ratio for embryos of a younger gestational age. Unfortunately, external genitals are an unreliable index for this purpose before the 5-cm. stage. Former investigations were based on histological examination of gonadal tissue¹. Recently, Tricomi *et al.*² determined the ratio of male to female embryos by examining the placental tissue obtained by curettage for the treatment of incomplete abortions. Their investigation was based on the observations of Graham³ and Glenister⁴, who noted the presence of the sex-chromatin in the trophoblastic cells before gonadal differentiation. Park⁵ was able to demonstrate that a morphological sex difference is present in the trophoblastic cells of 10–12-day-old embryos.

The accepted secondary sex ratio of man the world over is 106 males to 100 females. All data available now indicate that more males than females are lost during the early months of pregnancy. Tricomi *et al.*² examined 242 abortion specimens and found a ratio of 160 : 100.

The primary sex ratio, that is the ratio which prevails at the time of fertilization, is not yet known. The investigators mentioned accept an incidence of abortions of 10 per cent and by using a weighted mean they assume that the primary sex ratio may approximate 111 : 100, male to female.

Since all investigations until now were carried out on placental tissue obtained from curette material of incomplete abortions, it seemed to us worth while to examine the distribution of sexes in normal early pregnancies.

Fresh placental tissue obtained from 300 medical abortions in apparently normal early pregnancy was investigated. Identification of the sex-chromatin mass was carried out according to the usual histological method. One hundred cells from each specimen were examined at an approximate magnification of 1,000 (oil immersion). The percentage of the sex-chromatin positive cells for female tissue ranged from 30 to 80, that for male from 1 to 8. Preliminary investigations established the reliability of the procedure⁶.

165 of our specimens have been classified as male and 135 as female. This result gives a ratio of 122 : 100, male to female. Though the material is too small a series to be conclusive, the results of our investigations indicate a greater incidence of the male sex in the primary ratio than that calculated by Tricomi *et al.*².

Since theoretically there should be as many Y-bearing as X-bearing sperm, the ratio at the time of

conception should be 100 : 100. Why an egg should be fertilized more frequently by a sperm with Y-chromosome would then have to be explained.

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¹ Tietze, C., *Human Biol.*, **20**, 156 (1948).

² Tricomi, V., Serr, D., and Solish, G., *Amer. J. Obst. Gyn.*, **79**, 504 (1960).

³ Graham, M. A., *Anat. Rec.*, **119**, 469 (1954).

⁴ Glenister, T. W., *Nature*, **177**, 1135 (1956).

⁵ Park, W. W., *J. Anat.*, **91**, 369 (1957).

⁶ Szontágh, F. E., *Orvosi Hetilap*, **102**, 529 (1961).

A Rare Phenotype within the Gm System

IN 1956 Grubb¹ published the discovery of a serologically demonstrable γ -globulin factor, which was found to be inherited as a Mendelian dominant. Since then several related factors apparently belonging to a common hereditary system, the Gm system, have been demonstrated. At present the system comprises the following factors: Gm(a) (ref. 1), Gm(x) (ref. 2), Gm(b) (refs. 3,4) and Gm-like (ref. 5).

Disregarding Gm-like, which has not been found in Caucasians, the following phenotypes have been reported: Gm(a + x + b +), Gm(a + x - b +), Gm(a + x + b -), Gm(a + x - b -) and Gm(a - x - b +). The phenotypes Gm(a - x + b +), Gm(a - x + b -) and Gm(a - x - b -) have not been encountered in spite of rather extensive investigations.

According to the study material factors Gm(a) and Gm(b) appear to be Mendelian dominants, being controlled by allelic genes. Gm(x) also behaves as a Mendelian dominant, but until now has only been demonstrated in sera exhibiting the Gm(a) factor also. In work involving Gm(a) and Gm(x) typing in adults from a series of Danish paternity cases one example of the phenotype Gm(a - x +) was encountered. The serum sample belonged to a healthy woman, A. P., and the result was checked by examining a new blood sample at a later date. The distribution of Gm-phenotypes in the series is shown in Table 1.

In order to clarify the significance of the unusual phenotype an investigation of the kindred of A. P. was undertaken. The result of the Gm typing is shown in the pedigree (Fig. 1).

It is seen that the quite common phenotypes in the P-generation give rise to the rare phenotype

Fig. 1