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EVIDENCE FOR SMALLER PROBABILITIES FOR TRISOMIC MOSAICISM FOR ACROCENTRIC THAN FOR NONACROCENTRIC CHROMOSOMES

To the Editor: In a recent paper by one of us [1], it was pointed out that there is a large discrepancy between the estimates of prenatal and live-birth incidences of mosaic trisomy. Estimates of the former incidence range from 6%–33% with several observations about 10%, while estimates of the latter incidence amount to 1%–2% and are mainly based on trisomy 21 data. To explain this discrepancy, different possibilities were considered. It was briefly mentioned that the probability for mosaicism might not be constant in each chromosome and might be lower for those trisomies, like chromosome 21, which were often viable until term. Little evidence was found for or against such an explanation.

We will again consider the possibility that each chromosome has its own probability for mosaicism. Since it seems unlikely that mosaic trisomies are more likely to abort than are nonmosaic trisomies, the proportion of mosaics for a certain trisomy is unlikely to decrease. A low proportion of mosaics for a certain trisomy at a late stage in gestation or among live births will, therefore, indicate that the probability for mosaicism is low for this trisomy. Because of the morphological and functional differences between acrocentric and nonacrocentric chromosomes, the probabilities for mosaicism might be different for these two groups of chromosomes. The low proportion of mosaics among live-born 21 trisomies may be a reflection of the fact that the probability for mosaics is lower among acrocentric than among nonacrocentric chromosomes.

In the data presented in [1], we have found some support for this explanation. Among the spontaneous abortions, 76 trisomies for nonacrocentric chromosomes were observed, 10 of which are mosaics, while among 27 trisomies for acrocentric chromosomes, no mosaics at all were found. In these data, there are significantly too few mosaics among trisomies for acrocentric chromosomes ($P = .04$) with the one-sided alternative indicated above.

The study has continued, and so far 175 trisomies for nonacrocentric chromosomes have been found, 19 of which are mosaics, while among 79 trisomies for acrocentric chromosomes, only a single mosaic has been observed.

The probability for this and a more deviating result is

$$\left[\binom{79}{0}\binom{175}{20} + \binom{79}{1}\binom{175}{19}\right]\Big/\binom{254}{20} = 0.0045 ,$$

which is highly significant.

From this test result, it seems reasonable to conclude that the acrocentric chromosomes have a lower probability for mosaicism than do nonacrocentric chromosomes. Also, the observed proportion of mosaics among acrocentric trisomies, 1/79, agrees well with the proportion, 1%–2%, observed among live-born 21 trisomies. Hence, the discrepancy between the estimates of prenatal and live-birth incidences may be explained by the fact that mostly acrocentric trisomies survive until term.

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