74. Two Sibs with Regular Trisomy 21 from the Parents with the Normal Karyotype

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The repeated occurrence of trisomy 21 without the translocation in the same couple with normal karyotype is a rare event and is a still discussible event for the causes. We wish to describe in this paper an additional family in which two children with trisomy 21 without the translocation were delivered by the same couple with the normal karyotype.

Family data. The mother was 51 years old when she was seen for the first time in 1983 seeking for genetic counselling when the second child get married. She was the youngest of a sibship of three. The father was 53 years old in 1983. He was the second of a sibship of seven. They had three children who were 27, 24, and 19 years old. The eldest boy and the youngest girl were affected by

Fig. 1. Pedigree of the affected family.

Down syndrome (Fig. 1). The parents were phenotypically normal and not consanguineous, there were no evidences in them for drug ingestion, for the exposure to atomic bomb or radiation, and for viral infection. No stillbirths nor case of congenital malformations and mental retardations were reported in the families of the parents.

Cytogenetic findings. Chromosome preparations were made from leucocyte cultures established from the three children and their parents. For differential staining, the G-banding procedure

was applied to air-dried slides prepared from the above subjects. Chromosome counts were done on 100 well-delineated metaphases in each sample. The satellite association was observed on 100 well-delineated metaphases in the parents. Karyotypes were analysed on 24 cells in each based on the conventional Giemsa and G-banding preparations.

Fig. 2. Partial karyotypes of the affected family. 1, mother; 2, father; 3, eldest boy; 4, elder girl; 5, younger girl.

Chromosome analysis of the affected children showed trisomy 21 without the translocation. The karyotype analysis of the parents and the second child revealed a normal chromosome constitution and no mosaicism with no. 21 extra chromosome (Fig. 2). The incidence

of the satellite association in the parents showed no an increased tendency in cells comparing with a normal karyotype group (Kadotani *et al.*, 1978) (Table I).

Table I. Series of Satellite associations and their frequencies (%) in cells from the parents

	Age (year)	Cells obs.	Types of associating involving															Total
			2 chroms.			3 chroms.			4 chroms.			5 chroms.			6 chroms.			
			DD	DG	GG	DDD	D-G	GGG	D-D	D-G	G-G	D-D	D-G	G-G	D-D	D-G	G-G	
Mother	51	100	20	61	34	0	22	10	0	3	2	0	1	0	0	0	0	153
Father	53	100	26	54	21	4	31	0	0	5	0	0	0	0	0	1	0	142
Total (%)		200	46 (15.6)	115 (39.0)	55 (18.6)	4 (1.4)	53 (18.0)	10 (3.4)	0 (0)	8 (2.7)	2 (0.7)	0 (0)	1 (0.3)	0 (0)	0 (0)	1 (0.3)	0 (0)	295 (100.0)

Remarks and conclusion. Down syndrome is one of the most frequent cases for genetic counselling.

At present, more than 15 cases have been referred to in the literature (Hamerton *et al.*, 1961; Nuzzo *et al.*, 1975; Simoni *et al.*, 1976; Chemke and Goldman, 1977; Fujita *et al.*, 1978) for the occurrence of trisomy 21 without the translocation in the normal karyotype parents. Those cases could be caused by a genetic tendency for non-disjunction or by mosaicism, with gonadal involvement, in one of the normal parents. The parents of our case showed a normal karyotype in leucocyte cultures. In general, it has been shown that the satellite association is one of important cytogenetic events to cause nondisjunction in somatic cells, and thus to the induction of trisomy 21. Several investigators have noticed cases of increased satellite association in families, in which trisomy 21 have been shown (Curtis, 1974; Houghton and Houghton, 1978; Hansson and Mikkelsen, 1978; Krajewska-Walasek, 1980; Hansson, 1979; Krishna Murthy and Ambani, 1981). In the parents of our case, however, the incidence of the association did not significantly increase than in normal population. The same to our finding was reported by some other workers (Frøland and Mikkelsen, 1964; Curtis, 1974; Jacobs and Mayer, 1981; Wachtler *et al.*, 1981). Considered from the above reports, after the birth of a child with Down syndrome, the chromosome analysis of cultured amniotic fluid cells is shown in each further pregnancy. We hope future publications of similar case reports will shed further light on the cause of repeated occurrence of trisomy 21.

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