

Down's Syndrome: The Father's Role

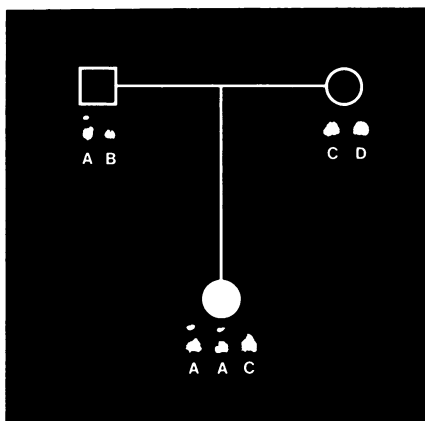
Older women have been known, since 1876, to be at special risk for giving birth to children with Down's syndrome, and it has been known since the 1960s that the mental retardation and physical abnormalities that usually accompany Down's syndrome, such as a flattened head and facial contours, are due to a chromosomal error. In 95 percent of cases, the error is the presence of three number 21 chromosomes instead of the normal two; this is called trisomy 21 Down's. In the other five percent of cases, the aberration is either a translocation of a piece of chromosome 21 onto another chromosome, or the presence of trisomy 21 or a chromosome 21 translocation in only some tissues of the body. Because advanced maternal age is associated with increased risk for giving birth to a child with Down's syndrome, the general belief has been that the chromosomal mishaps leading to the abnormality originate in eggs, not sperm.

Mounting evidence, however, is challenging this consensus and suggesting that Down's syndrome is due, in about one-fourth of all cases, to chromosomal errors of paternal rather than maternal origin. In other words, the abnormalities are in sperm, rather than in eggs, in some cases. Evidence is also suggesting that the errors in sperm are due, at least in a number of instances, to paternal age. These findings have some practical implications, both for parents of children with Down's syndrome and for would-be parents who are concerned about having a defective child.

The first question one probably asks, of course, is why a link between fathers and Down's has come to light only recently. The answer is that the discovery had to wait for certain advances in human genetics. Until 1970, geneticists could positively identify, under the microscope, only four of the 23 pairs of human chromosomes in a normal karyotype (the chromosomal complement of an individual). Then a Swedish scientist named Caspersson reported a staining technique by which human chromosomes could be stained with a fluorescent dye called quinacrine mustard that reveals specific light and dark bands on the chromosomes. Using this method geneticists were finally able to distinguish each of the 23 pairs of human chromosomes. And hard on the heels of Caspersson's advance, U.S. scientists discovered a staining technique that differentiates specific regions of chromosomes without a fluorescent microscope. This was the Giemsa-banding stain (SN: 9/25/71, p. 200). Both staining techniques,

There is mounting evidence that a substantial number of Down's syndrome cases are due to chromosomal mixups of paternal, rather than maternal, origin

BY JOAN AREHART-TREICHEL



A karyotype of a Down's child and her parents reveals that extra chromosome 21 comes from father, not mother.

coupled with some modifications and improvements, have since allowed geneticists to determine not only all chromosomes and chromosomal abnormalities in the karyotypes of Down's patients, but in many instances to compare their particular, inherited chromosomal structures to those of their parents, and thus to determine which of the abnormal 21st chromosomes have arisen from their mothers and which from their fathers.

The leading U.S. geneticist to so deploy the chromosomal staining techniques is R. Ellen Magenis of the University of Oregon Health Sciences Center in Portland. To date, Magenis and her co-workers have compared chromosomes from 61 Down's patients with those of their parents and have been able to assign parental origin of the patients' chromosomal abnormality in 49 cases. And of these 49 cases, 22 percent have derived their chromosomal mistakes from their fathers. Magenis's data also suggest that while trisomy 21 Down's is far more common than translocation Down's, there is a higher rate of paternal origin among the latter than among the former. These results were presented at a conference on Down's syndrome held in Boston in September 1978. Other researchers have since found the contribution of fathers to Down's syndrome to be between 20 and 25 percent.

Why should fathers as well as mothers

contribute to Down's syndrome? Age may be the answer. In 1977, for example, Jan Stene of the University of Copenhagen and his colleagues applied newly developed statistical methods to study 218 Down's subjects and 5,633 controls. The researchers examined the relative incidence of the disorder with advancing paternal age, with maternal age controlled. They found a marked increase in Down's children among fathers 55 years and older. In 1978, Japanese investigators compared paternal age distribution of 1,279 Down's subjects born between 1952 and 1968 with corresponding distribution for the general population. The results were similar to those of the Danish study: The relative incidence of Down's increases slowly for fathers up to the age of 49, then sharply for fathers 55 and older. Further evidence has also been obtained by educator Kippy I. Abrams and biologist Joan W. Bennett of Tulane University in New Orleans and was reported at an August meeting of the International Association for the Scientific Study of Mental Deficiency in Jerusalem. By using the latest statistical methods, Abrams and Bennett reanalyzed parental age data from the Baltimore epidemiologic study of Down's syndrome conducted between 1965 and 1977 and found an excess of Down's children born to older fathers as well as to older mothers. But Abrams and Bennett's analysis has unearthed something else — a surplus of Down's children born to extremely young fathers and to extremely young mothers. Thus, not only older fathers and mothers, but considerably younger fathers and mothers appear to be at risk for giving birth to children with Down's syndrome.

Why should markedly young or old parental age increase one's risk of having a Down's child? Scientists aren't sure. How-



Abrams, Bennett examine Down's case.

ever, Kentucky researchers recently offered a hormonal explanation for the excess of Down's offspring born to considerably younger and older mothers. (SN: 8/18/79, p. 117). Perhaps such an explanation will eventually be extended to extremely young and old fathers as well.

An equally critical question, of course, is whether parental age is the sole cause of Down's, or whether other factors might also contribute. Here, too, researchers are in the dark. But since Abroms and Bennett did not find a high correlation between parental age and Down's, they suspect that other factors than parental age may be just as, if not even more, important culprits. Or, as Abroms puts it, "What are the effects of ionizing radiation? What are the effects of certain drugs? What are the effects of diet? We don't know."

Even with these questions unanswered, though, the above findings have some practical implications. For one, mothers of Down's children should no longer berate themselves for being the sole contributors to their children's disorders. So advises Lewis B. Holmes, a geneticist with the Massachusetts General Hospital in Boston. For another, genetic counseling to prevent Down's, which is currently directed to older mothers, should also be extended to older fathers and to much younger mothers and fathers, contend Abroms and Bennett. □

... Jonestown

tained poison and that we would die within 45 minutes. We all did as we were told."

As well as the group's vulnerability, what Jones played upon — and what finally turned such rehearsals into the real thing — was the "self-hatred" of not only his followers but of himself. As one member wrote, "Dear Dad and Savior—I have many times been so disgusted with myself... I hate being old I hate it... I know you are the truth and the way... I hope I die before I ever betray you." Such letters, says Ulman, "suggest that whatever agony was in these people's lives before they joined the People's Temple was not merely mirrored in Jonestown but rather shaped by Jones so as to give their pain and anguish the seeming virtue of self-sacrifice and ennoblement."

As for their leader himself, Jones's own self-hatred was evident in his constant need for omnipotence, to be loved by everyone and to be everyone's "best" lover. "Everyone had to say he [Jones] was the only true heterosexual man in the world... to compensate for his feelings of inferiority," Lasaga says. "He was bisexual, but he 'hated' homosexuals — as he demonstrated by punishing them. Therefore, he hated himself... there was tremendous cognitive dissonance."


To help cope with his own internal

struggles — and those of his followers — Jones turned to drugs. "He was a very heavy user of amphetamines," says Singer. And to temple members, Jones dispensed vast amounts of Quaaludes, Demerol, Valium, morphine and Thorazine to control behavior, according to the researchers. These all appeared to contribute to the community's steady withdrawal from reality and to the final tragedy.

In such an atmosphere, says Ulman, "a pathological, collective regression may take place whereby the leader and followers become partners in a form of group decompensation. In a sense they are victims of each other... [Jones] stripped the group of the ability to fight for their lives, [and] their acquiescence and adulation probably contributed to his weakening hold on reality."

What most group members sought, Ulman says, was "to magically merge with their idealized omnipotent leader in hopes of overcoming their lack of a positive self-image and correspondingly healthy self-esteem. Unfortunately, the price they paid was total masochistic surrender to Jim Jones."

To Lasaga, "Jonestown was a mini-totalitarian state ruled by the primitive mind of a paranoid." Jones had to be "reassured every day that people would die for him." The mass suicide, he adds, was the ultimate "orgasm of power." □



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