

Joan Arehart-Treichel reports from the Second International Congress of Twin Studies in Washington

## Fraternal twinning on the decline

The chances of producing identical twins have not changed much in developed countries in recent years, but the chances of producing fraternal twins have declined, reports W. H. James of University College in London.

This drop, he asserts, cannot be explained by a generally declining birthrate, by widespread use of oral contraceptives, or by any changes in maternal age or maternal fertility (three factors known to influence fraternal twinning). However, several different research studies have led James to conclude that the drop in fraternal twinning may be due to a lowering of men's sperm counts. Such a drop would reduce the possibility of a man fertilizing two eggs rather than one during intercourse—the means by which fraternal twins are conceived. (Identical twins develop from only one fertilized egg.)

Why might men's sperm counts be low? James suspects that it might be due to the widespread manufacture and use of pesticides and other toxic agents known to impair male reproduction. For instance, the pesticide DBCP (dibromochloropropane) was recently indicted as the cause of low sperm counts and reproductive difficulties among men working in a California DBCP plant (SN: 8/13/77, p. 101).

On the other hand, I. MacGillivray of the University of Aberdeen in Scotland speculates that the drop in fraternal twinning in developed countries may be due to women dieting more and weighing less than they did a few years ago. Overweight women are more likely to conceive fraternal twins than are normal weight and thin women, MacGillivray and his colleagues have found, because overweight women produce higher levels of sex hormones and, hence, are more likely to have multiple ovulations.

## Nigeria's high twinning rate

In contrast to the developed countries, Nigeria has a very high fraternal twinning rate, four times greater than that of the United States, reports P.P.S. Nylander of the University of Ibadan in Nigeria. The identical twinning rate in Nigeria is about the same as that of the rest of the world.

The cause of high fraternal twinning is not genetic, Nylander explains, because the high twinning rate does not extend to Nigeria's upper classes. Therefore it is environmental. But what aspect of the environment is responsible? Nylander suspects that the cause is probably dietary—specifically, a certain species of yams that are eaten by the lower classes in Nigeria. The yams are consumed mainly by western Nigerians, who have an even higher fraternal twinning rate than do eastern Nigerians.

## The womb: A psychosocial shaper

Twin studies are giving researchers a better idea of how prenatal influences, rather than genes, can affect psychological development later in life. St. Lis and A. Janus-Kukulska of Warsaw University and the Warsaw Academy of Medicine studied psychosocial development among identical twins who had been born different weights. They report that twins born with a lower weight developed less mentally and had more social-emotional disturbances than their heavier-born cotwins.

## Height, weight and genes

R. S. Wilson and A. B. Dolan of the University of Louisville studied identical and fraternal twins early in life to get a better idea of how genes and the environment influence height and weight. Their findings suggest that height is mostly under genetic control, whereas weight is affected by both environmental and genetic influences.

At four years of age, for instance, identical twins were found to be 94 percent like their cotwins in height. Fraternal twins were found to be only 60 percent so. Because both identical and fraternal twins share a common environment with their cotwins, but only identical twins have the same genes as their cotwins, this finding implies that height is determined more by genes than by environment. However, because 6 percent of identical twins were not of the same height as their cotwins, environment apparently has some impact on height.

On the other hand, at four years of age, identical twins were found to be only 86 percent like their cotwins in weight, compared with the 94 percent in height. This finding suggests that weight is more under environmental control than is height. Still, weight must be subject to some genetic influence because at four years of age fraternal twins were found to be only 50 percent alike in weight, compared with the 86 percent for identical twins.

When might environment or genes influence weight? The environment may be more important earlier in life, and genes more important later. For instance, fraternal cotwins may be more alike in birth size than they will be later in life, whereas identical twins may show large differences at birth, but converge later.

## Temperament among twins

Although temperament differences are greater for fraternal twins than for identical twins, they can be found among the latter, reports A. P. Matheny Jr. of the University of Louisville. With colleague A. B. Dolan, Matheny examined parental reports of expression of temperament among twin pairs. The more temperamental twin in each pair was generally found to be more active, demanding and dominant, the less temperamental twin more affectionate, sociable and smiling and more likely to do better in school.

## Leukemia therapy for twins

A major problem in treating leukemia patients is killing their cancerous bone marrow cells without also wiping out their healthy bone marrow cells. One way to counter this difficulty would be to give a patient drug and X-ray therapy, then a transplant of healthy marrow cells. But marrow transplantation presents another hurdle. Because the marrow is rarely identical immunologically from one person to another, a patient's body may reject transplanted marrow as foreign, or worse yet, the marrow may reject the patient, in a formidable condition known as graft-versus-host disease.

However, marrow should not be rejected or reject if it is donated to a patient by an identical twin, because both would have immunologically identical marrow. Alexander Fefer of the University of Washington School of Medicine and his colleagues have tested this hypothesis. Even more crucially, they have attempted to determine whether marrow transplants from cotwins can lead to the successful treatment of leukemia.

Their study focused on 38 leukemia patients who had identical twins. The patients' ages ranged from 4 years to 67 years. Their anticipated lifespans were in weeks. The researchers obtained marrow from the patients' cotwins and transplanted it into the patients after the patients had been given extensive leukemia therapy. As the investigators hoped, there was no rejection problem. Even better, the transplanted marrow helped extend the lives of 30 of the 38 patients. In fact, 11 of the 30 are still alive, seven years later, with no signs of cancer.

Thus, those leukemia patients who have an identical twin who can donate marrow to them have a considerably greater chance of survival than do leukemia patients without an identical twin.