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### DNA PROBES FOR DETERMINATION OF TWIN ZYGOSITY AT BIRTH

Determination of zygosity in twins is of importance not only for epidemiological, genetic and obstetric studies but also because of the difference in prognosis between monozygotic and dizygotic twins. Monozygotic, or identical twins have lower birthweights, more medical complications, and higher mortality rates than dizygotic twins. In Caucasians about 30% of newborn twins are of unlike sex and therefore dizygotic. Examination of the placental membranes shows another 20% of cases to be monochorionic and these are always monozygotic. The remaining 50%—a proportion that is relatively constant between populations—are of like sex, have diamniotic dichorionic placentae, and may be either monozygotic or dizygotic. Various methods have been employed to determine zygosity in these cases, including assessment of general appearance, fingerprinting, skin grafting, taste testing, and determination of genetic markers. Genetic markers are the most reliable, with an accuracy of 95-98%, but large numbers of such markers must usually be investigated because of the low mean heterozygosities of most protein and antigen variants.

Recently, minisatellite DNA probes that detect many regions of great variability within the human genome have been described. Southern blot band patterns detected by these probes are so polymorphic that they may be regarded as genetic "fingerprints" which can be used for individual identification. Minisatellite probes consist of multiple repeated copies of a common 10-15 base pair "core sequence". On hybridisation to restriction enzyme digests of human DNA they simultaneously detect many highly polymorphic minisatellites at different loci in the genome, and produce band patterns that are individual-specific. Clearly, such probes should be of considerable use in, for example, forensic medicine and paternity testing. The DNA fingerprints are somatically stable and have been shown to be identical in monozygotic twins.

Minisatellite DNA probes were used to examine DNA from twelve sets of newborn twins. In the seven cases where the twins were known to be monozygotic or dizygotic, from sex observation or placental examination, the DNA result agreed with these findings. In the other five twin pairs and in two sets of triplets DNA analysis allowed rapid determination of zygosity. Minisatellite DNA probes provide a single genetic test that should allow positive determination of zygosity in all cases of multiple pregnancy.

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