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Correspondence

Commentary on: Rubocki RJ, McCue BJ, Duffy KJ, Shepard KL, Shepherd SJ, Wisecarver JL. Natural DNA mixtures generated in fraternal twins *in utero.* J Forensic Sci 2001;46(1):120–5.

A report by Rubocki, et al., "Natural DNA Mixtures Generated in Fraternal Twins in utero" is of interest. Initial testing of a male suspect revealed three alleles at four of nine tested loci, suggesting multiple sources of origin. Given that the suspect in question was a DZ twin, the authors correctly noted that chimerism (exchange of hematopoietic components in utero) could explain their anomalous finding. Unfortunately, additional specimens from the twin his co-twin and other family members were unavailable for confirmatory study.

Only six case studies of human chimeric DZ twins, published between 1976 and 1993, are cited in the report, prompting the conclusion that chimerism "has been described infrequently" (p. 120). That was the concensus in 1975 at which time chimerism had been documented in just 25 cases (1). However, recent work shows that chimerism is more frequent than suspected. Blood group chimerism occurred in 8% (32/415) of fraternal twin pairs and in 21% (12/57) of fraternal triplet sets (2). Interestingly, the first reported case in 1953 was discovered in a female twin 25 years after the infant death of her twin brother (3). Another noteworthy case concerns male-female twins discordant for trisomy-21 (4). The twins' blood groups were identical, consistent with monozygotic (MZ) twinning, in which case the genetic anomaly might have occurred subsequent to zygotic splitting. However, the twins' differing sex lead investigators to believe the twins were dizygotic and chimeric.

The many variations among both MZ and DZ twin pairs are important to forensic studies (5). Further examination of these unusual cases will illuminate previously puzzling outcomes, as was aptly shown by the Rubocki et al. analysis.

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Author's Response

Sir,

We read with interest, the letter submitted by Dr. Nancy Segal in response to our recent article. We were initially perplexed when we encountered this unusual sample during our routine casework studies. As pointed out by Dr. Segal, we did not perform an exhaustive literature review on this topic. We were primarily interested in establishing that such situations do occur in nature. Our intent in publishing this manuscript was to inform other investigators and criminalists of this phenomenon so that they would be aware of this and would not misinterpret profiles obtained from their casework. The article by vanDijk and workers (*The American Journal of Medical Genetics,* 1996; Ref 2), cited by Dr. Segal, will be of interest to persons involved in human identity testing. We thank Dr. Segal for providing these additional references and for her comments concerning this subject.

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