Monozygotic Twins: Identical in Name Only

To the Editor:
We found the study of clinical responses to opioids by Angst et al.1 to be an excellent first-of-its-kind study for distinguishing the contribution of heredity versus environment. Much work has been done using twins to separate heredity from environment and this addition to our literature is timely.

Although the use of twins to separate nature from nurture is a long-established model, we would have appreciated more detailed analysis of the monozygotic twins. Genetically, dizygotic twins are no different from other nontwin siblings (assuming the same parents). Contrary to what was stated by the authors, monozygotic twins do not share 100% of their DNA. Copy number variants and single-nucleotide polymorphisms have been discovered, which distinguish one monozygotic twin from the other.2,3 Moreover, there are differences in regulation and expression of the shared monozygotic genes. These very small and seemingly inconsequential differences probably account for the differences in disease susceptibility between monozygotic twins4–9 and may be significant in their reaction to opioids.

Twins raised together do not share 100% of the same environment. Very small differences in environment such as those that occurred in the womb or even in the seemingly identical home and school environments may result in the methylation of a gene in one twin but not in the other.9–11 Epigenetic variability has also been found to increase with age, which may lead to increasing differences as monozygotic twins evolve from infancy to adulthood.3 We look forward to further investigation from the authors, which will address these additional factors.

Ray Greek, M.D., Mark J. Rice, M.D.* Departments of Anesthesiology and Pharmacology, University of Florida College of Medicine, Gainesville, Florida.

*Correspondence: mrice@anest.ufl.edu

References