

on this topic and believe it should be left up to individual centers as to whether they think it is worth pursuing.

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REFERENCES

1. Johnson JE, Higdon HL III, Blackhurst DW, Boone WR. Expectations for oocyte fertilization and embryo cleavage after whole sperm vs. sperm head intracytoplasmic injection. *Fertil Steril* 2004;82:1412–17.
2. Palermo GD, Colombero LT, Rosenwaks Z. The human sperm centrosome is responsible for normal syngamy and early embryo development. *Rev Reprod* 1997;2:19–27.

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Modeling age at menopause

To the Editor:

From their study, van Asselt et al. (1) report a heritability of 44% for the menopausal age in a Dutch sample of 164 mothers and their daughters. This heritability estimate is based on a familial correlation of 0.22. As noted by the authors, this correlation can be due to either shared genes or shared environment, and the heritability is therefore overestimated if shared environmental factors influence the trait. With twin data, it is possible to disentangle the influences of shared genes and shared environment.

We analyzed data on age at natural menopause from 200 twin–sister pairs from the Netherlands Twin Register (NTR) (2). We had data for 52 monozygotic (MZ) twin pairs and for 148 dizygotic (DZ) and sister (sibling) pairs. Mean age at time of completing the NTR survey was 56.05 years (SD = 5.3). A mean age of 47.3 years (SD = 6.2) for age of menopause was reported, with a 2-year test–retest correlation for age of menopause of .87 ($P=.000$) in a sample of 177 women who completed the survey twice.

The correlation for age at menopause was 0.597 ($P=.000$) for MZ twin pairs and 0.170 ($P=.039$) in the DZ–sister group. This pattern of correlations strongly suggests genetic influences on age at natural menopause. We used structural equation modeling to obtain estimates of the additive genetic (A) and environmental variances (E). We also tested whether

a model that included shared environment explained the data better than an AE model. Results showed that shared environmental influences did not contribute to the variation in age of natural menopause [$\chi^2(1) = 1.72$]. The heritability estimate was 60% (95% confidence interval 37%–91%) for variance in age at natural menopause.

Our result, from a Dutch sample recruited through the NTR, thus is in line with the heritability (44%) based on mother–daughter correlations and the heritability (71%) reported earlier for an independent, somewhat smaller, sample of Dutch twins (3). We can conclude that in the Dutch population, the heritability for age at menopause is approximately 60%. This is in line with other studies that investigated the heritability of the age at natural menopause (4, 5). Because several studies have detected a genetic influence on menopausal age, this suggests that women with a family history of early menopause are at higher risk to experience an early menopause themselves.

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REFERENCES

1. Van Asselt KM, Kok HS, Pearson PL, Dubas JS, Peeters PHM, te Velde ER, et al. Heritability of menopausal age in mothers and daughters. *Fertil Steril* 2004;82:1348–51.
2. Boomsma DI, Vink JM, Beijsterveldt CEMv, Geus de EJC, Beem AL, Mulder EJCM, et al. Netherlands Twin Register: a focus on longitudinal research. *Twin Res* 2002;5:401–6.
3. de Bruin JP, Bovenhuis H, van Noord PAH, Pearson PL, van Aarendonk JA, te Velde ER, et al. The role of genetic factors in age at natural menopause. *Hum Reprod* 2001;16:2014–8.
4. Snieder H, MacGregor AJ, Spector TD. Genes control the cessation of a woman's reproductive life: a twin study of hysterectomy and age at menopause. *J Clin Metab* 2001;83:1875–80.
5. Treloar SA, Do KA, Martin NG. Genetic influences on the age at menopause. *Lancet* 1998;352:1084–5.

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Technical challenges in freeze–thawing of human ovary

To the Editor:

We have read with great interest the recent article on freeze–thawing of intact human ovary with its vascular pedicle by Martinez-Madrid et al. (1). There are some details that are not discussed in the article that are important for understanding their work. We agree that cryopreservation of the entire organ with its vascular pedicle is technically feasible, as we showed in our earlier work (2, 3); however the authors need to address the following points. First, they said the ovary was placed in a cryovial where it was pre-equilibrated,