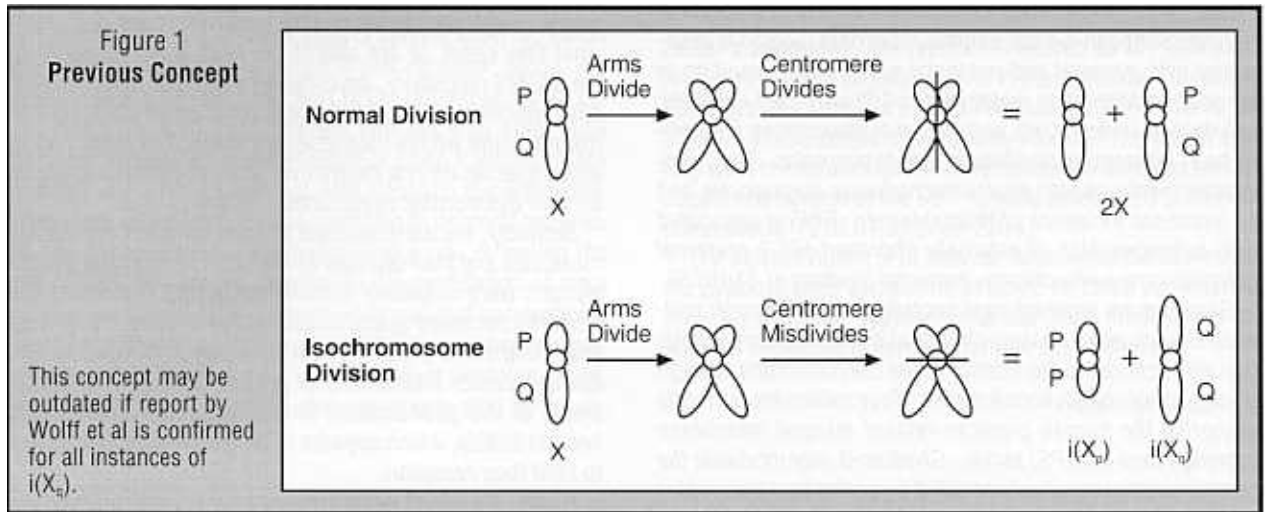


a particular nucleotide sequence, or is sequence dependent, also will help clarify X chromosomes that are predisposed to isochromosome formation. It also may help to determine whether certain X chromosomes are more predisposed to producing germ cells or zygotes with sex chromosome loss,

addition, or changes. The hypothesis cited above regarding inactivation of 1 centromere in a dicentric $i(Xq)$ requires further study.

Judith G. Hall, MD



A Regression Method Including Chronological and Bone Age for Predicting Final Height in Turner's Syndrome (PTS), With a Comparison of Existing Methods

Van Teunenbroek et al present a new method for predicting final height (FH) in girls with Turner syndrome using either the Greulich and Pyle (GP) or Tanner and Whitehouse (TW) bone age determinations. The predicted final height in these Turner girls was either PTS by Gruelich Pyle (PTS_{GP}) or by TW using radius, ulna, and short bones (PTS_{RUS}). To develop their regression equations, they utilized data from 57 Dutch women (235 measurements points). These women were born between 1934 and 1973 and, with the exception of estrogen, received no other growth-promoting agents. Criteria for the achievement of final height included: (1) a follow-up to at least age 20 years; or (2) a height velocity of <0.5 cm over the previous year; or (3) a height velocity of <1 cm over the previous 2 years and a bone age (TW) of at least 15 years of age. The PTS, which they developed, can be calculated as follows: FH (final height in centimeters) = $a \times H$ (actual height) + $b \times CA$ (chronologic age) + $c \times BA$ (bone age) plus a constant. Smoothed regression coefficients and constants were created for chronologic ages 6 through 19 years for both the TW and GP systems. A prediction error was calculated to compare other prediction methods with this new equation. The mean prediction errors of both the PTS_{RUS} and the PTS_{GP} were small and similar except for the chronologic ages of 15 through 18 years. There was an overall tendency to over predict final height; however, the mean error of all final height predictions was less than for the Bailey-Pinneau (BP) methods.

Editor's comment: The authors point out the importance of having a single variable prediction method for FH in girls with Turner syndrome. In addition, they restate that BP and TW methods were developed from data on healthy children and included predictions of a pubertal growth spurt. Thus, these methods are not particularly useful in the prediction of FH in girls with Turner syndrome. Accurate FH predictions could be useful in deciding whether to initiate growth hormone therapy and in evaluating the effects of growth hormone and other anabolic agents on FH.

I agree with the authors' conclusions: "Of the single-variate FH prediction methods, the smallest mean prediction errors at most ages were observed using the modified PAH [projected height], with a good accuracy from the age of 9 years onwards. Averaging mPAH [modified PAH] with methods allowing for BA increased the accuracy of the more inaccurate method substantially. Thus, if population-specific Turner reference data are available, a number of calculations (with possible errors) can result in a smaller mean prediction error and a higher accuracy. On the other hand, the simplest methods—the mPAH and PAH—were remarkably good at most ages." This article should be read by all groups evaluating the effects of therapeutic agents on the ultimate heights of children.

Van Teunenbroek A, et al. *Acta Paediatr* 1996;85:413-420.

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