

LAY ABSTRACT

TITLE: Sex Hormone Phenotypes in Young Girls and the Age at Pubertal Milestones

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Puberty starts at different ages in young girls. No one really knows why. We studied 269 girls from Greater Cincinnati and examined them for breast growth during puberty. Four hormones were measured at three time points: before, at, and after breast growth. The average age of breast growth for all the girls was 9.02 years. We grouped the girls into four hormone profile phenotypes, taking into account all of the hormone measurements for each girl. A phenotype is a group of girls who have similar characteristics in common, for example, the same hair color. In this case there are four phenotype groups that have different levels of four reproductive hormones around the time of puberty. Girls in Phenotype 1 had high DHEA-S, estrone and testosterone. Girls in Phenotype 2 had the highest estradiol levels. Their estradiol greatly increased six months after breast growth. They were the youngest at the time of their first menstrual period (11.87 years compared to 12.56 years for Phenotype 1). They also had the shortest time between breast growth and starting their menstrual periods. Girls in Phenotype 3a had low levels of hormones. Girls in Phenotype 3b also had low levels of hormones that did not change over time. Surprisingly, they also had the youngest age at breast growth (8.67 years compared to 9.44 for phenotype 1). We then looked at the relationship between their phenotype and the age at pubertal milestones. The phenotypes were associated with different ages of breast growth, pubic hair growth and their periods. These findings help us understand the mechanisms behind different timings of pubertal events in girls.