Phytoestrogen Exposure and Pubertal Development

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The appropriate timing, within the life span, for dietary interventions aimed at disease prevention has been a topic of some discussion. Dietary intervention studies are usually conducted in adults, but earlier life exposures may be more important. Experimental studies suggest that puberty may be the critical period during which isoflavones, the phytoestrogens found in soy foods, have the maximum impact in reducing mammary cancer risk. This risk reduction appears to be related to enhanced cell differentiation resulting in fewer terminal buds, the structures most susceptible to carcinogenesis. In humans, adult soy consumption generally has been associated with breast cancer risk reduction in Asian women but not in non-Asian women. Recent epidemiologic evidence suggests that adolescent exposure to soy may be critical for risk reduction to occur. Thus, soy consumption during adolescence may explain the different results observed in epidemiologic studies conducted in different populations.

Age at menarche, a marker of pubertal development, is strongly influenced by modifiable physical and lifestyle factors and is a well-established risk factor for breast cancer. The GRowth and LifeStyle (GRLS) Study is an observational prospective cohort study examining the effects of soy consumption and polymorphic variation in genes in the steroid hormone pathway on age at menarche and other markers of pubertal development. We have enrolled 230 girls, age 10-13 at baseline, into the study and will be following them for the next two years. Approximately 40% of the girls are high soy consumers with an estimated isoflavone intake of at least 12 mg/d. The girls and one of their parents are participating in three in-person interviews (at baseline, 12- and 24-months). Blood (or buccal) and urine samples are collected and body measurements taken at each time point. Monthly follow-up is undertaken to ascertain the onset of menarche and the establishment of regular cycles.

Here we will present cross-sectional data from the baseline assessment for the first 159 girls enrolled in the study. 92 of these girls are premenarcheal and 67 are postmenarcheal. Cox proportional hazards regression analysis, with age (in days) as the time scale and stratifying on ethnicity, is used to evaluate the association between menarcheal onset and soy consumption. Adjusting for body size relative to other girls of the same age and ethnicity, urinary isoflavones levels do not appear to be associated with the onset of menarche in these preliminary cross-sectional analyses (HR=1.2, 95% CI: 0.56-2.7 for girls with urinary isoflavone levels ≥60 nM/mg Cr compared to those with levels <20 nM/mg Cr). Future analyses include an assessment of other markers of puberty and longitudinal analyses for which fewer assumptions are required.

The GRLS study is part of the Center for Nutrient-Gene Interaction funded under U54 CA100949 awarded to the University of Alabama, Birmingham.