

held in Bethesda, MD, in April 1996 recommended against a treatment policy that plans radical surgery and pelvic radiation therapy. For the present, HPV typing of cancers is a research technique of epidemiologic importance that also has relevance in unraveling the mechanisms of cervical carcinogenesis.

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## Breast Cancer Prevention in African-American Women

*Giske Ursin, Brian E. Henderson\**

Several studies (1-5) have successfully managed to influence estrogen levels in premenopausal women by low-fat and/or high-fiber diets. The article by Woods et al. (6) in this issue of the *Journal* further confirms that estrogen levels can be reduced by dietary modification. In their study, Woods et al. placed 21 healthy, premenopausal African-American women first on a typical American diet (40% of calories from fat, 12 g dietary fiber/day) for 3 weeks and then on a low-fat (20% of calories from fat)—high-fiber (40 g dietary fiber/day) diet for 7-10 weeks. This experiment resulted in statistically significant changes in follicular levels of estrone sulfate (16% reduction), estradiol (9% reduction), and androstenedione (18% increase).

The reductions in estrogen levels in this study fall within the ranges that have been observed in previous studies; a 5%-30% reduction in estrone sulfate and a 10%-20% reduction in estradiol have been reported after 2 months on a dietary regimen (1-5). The discrepancies between the various studies are probably at least partly due to use of different dietary compositions and/or length of intervention.

From a public health perspective, it is important to determine how likely these effects are to be long-acting and, therefore, to result in a reduced risk of breast cancer. If the diet-induced decrease in circulating estrogen levels is an effect of reduced

reabsorption and increased fecal excretion of estrogen, then this would imply that such diets could have long-acting effects on total estrogen levels and possibly on breast cancer occurrence. However, if the reduced hormone levels are simply a result of menstrual disturbances due to the physiologic stress associated with an altered diet, then this is unlikely to cause long-term effects on breast cancer risk. Such a stress effect could explain reductions in the follicular levels of estradiol if some women with normally short cycles experienced longer cycles (affecting mostly the follicular phase) after the start of the experimental diet. If this was the mechanism, then it is likely that the menstrual cycle would normalize and the hormone levels return to base-line levels after the participants became accustomed to their new diet.

The significance of the androstenedione increase in the study by Woods et al. (6) is unclear. The only previous data on changes in androstenedione levels after a dietary intervention come from

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\*Affiliation of authors. Department of Preventive Medicine, USC/Norris Comprehensive Cancer Center, Los Angeles, CA.

Correspondence to: Giske Ursin, M.D., Ph.D., Department of Preventive Medicine, USC/Norris Comprehensive Cancer Center, 1441 Eastlake Ave. MS# 44, P. O. Box 33800, Los Angeles, CA 90033-0800.

this same group of investigators (4), who reported that a similar intervention in white women resulted in a 10% decrease in androstenedione levels. Woods et al. (6) hypothesize that the increase in their current study could be due to a "different dietary mechanism" in African-Americans than in whites. Specifically, they suggest that, among these African-American women, the intervention may have resulted in reduced activity of the aromatase enzyme, so that less androstenedione was converted to estrone. This interesting hypothesis warrants further investigation. However, first these androstenedione findings should be confirmed in other intervention studies involving African-American women. It would also be helpful to have data on the association between androgen levels and breast cancer risk in African-Americans.

Perhaps more surprising than the effects of the intervention regimen itself were the findings obtained by Woods et al. (6) with regard to the base-line differences between African-American women in their present study (6) and white women in their previous study (4). The African-American women had 37% higher estrone levels, 55% higher total estradiol levels, and 48% higher androstenedione levels than the white women. Similar to the results reported above, these findings are based on 21 African-American women only and must be confirmed in larger studies. These data are, however, compatible with results from a study of circulating hormone levels in women in the early gestational period; serum testosterone levels were 48% higher, whereas total estradiol and free estradiol levels were 37% and 30% higher, respectively, in African-American women than in white women (7).

Epidemiologic data may provide some support for possible ethnic differences in hormone levels. African-American women tend to have earlier menarche than white women, and an early menarche may be associated with higher estrogen levels in adulthood (8,9). Physical activity may influence menstrual function, but whether African-American women tend to be less physically active than white women is unclear. African-American women are, on average, heavier than white women (10); in the study by Woods et al. (6) reported in this issue, the upper range of body mass index (BMI) was 38 kg/m<sup>2</sup> in African-American women. However, although the levels of sex hormone-binding globulin are lower (and consequently the levels of free estradiol may be higher) in obese than in lean premenopausal women, the levels of total estradiol are not (11). A recent study (12) even suggests that obesity is associated with lower levels of estrogen and androstenedione in premenopausal women. But although obesity may not be associated with increased hormone levels, the distribution of the weight may be. Woods et al. (6) discuss

the possibility that differences could be due to increased upper body obesity in African-American women.

If the findings of Woods et al. (6) are true, then the increased levels of estrogen (and possibly those of androstenedione) could perhaps partly explain why African-American women under 40 year of age have a higher risk of breast cancer than women of all other ethnicities in that age group (13). Furthermore, it is possible that reducing the hormone levels would reduce these women's risk of breast cancer. However, even if dietary regimens such as the regimen used in the study by Woods et al. (6) do result in long-term reductions in endogenous hormone levels, the magnitude of this reduction is only 10%-20%.

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