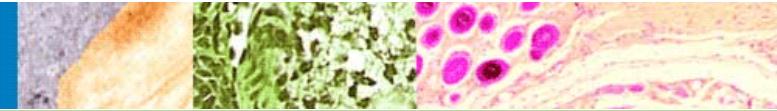


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## Lipoprotein subclasses and endogenous sex hormones in women at midlife

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### ABSTRACT

The objective of this work was to evaluate the associations between levels of endogenous sex hormones in women at midlife and lipoprotein subclasses. One hundred and twenty women (68 late peri-/postmenopausal and 52 pre-/early perimenopausal) from the Study of Women's Health Across the Nation (Pittsburgh site) were included. Lipoprotein subclasses were quantified using NMR spectroscopy. Participants (57.5% White and 42.5% Black) were  $50.4 \pm 1.9$  years old. Adjusting for age, race, cycle day of blood draw, BMI, physical activity, and alcohol consumption, a negative correlation was found between estradiol (E2) and medium-small LDL particle (LDL-P) concentration ( $p = -0.19$ ,  $P = 0.04$ ). Further, E2 was positively correlated with HDL particle (HDL-P) size ( $p = 0.22$ ,  $P = 0.02$ ). For sex hormone binding globulin (SHBG), independent negative correlation was found with total small LDL-P concentration. SHBG was also positively correlated with LDL-P and HDL-P sizes ( $P < 0.05$  for all). For free androgen index (FAI), positive correlations were found with concentrations of total VLDL particles, total LDL-Ps, and total small LDL-Ps. Additionally, FAI was negatively correlated with large HDL-P concentration, and HDL-P and LDL-P sizes ( $P < 0.05$  for all). Lower levels of E2 and SHBG, and higher levels of FAI were associated with a more atherogenic profile of lipoprotein subclasses. Sex hormone levels at midlife may increase women's risk of coronary heart disease.

[menopause](#)   [estradiol](#)   [free androgen index](#)   [sex hormone binding globulin](#)

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CV coefficient of variation  
E2 estradiol  
FAI free androgen index  
HDL-C HDL cholesterol  
HDL-P HDL particle  
HT hormone therapy  
LDL-C LDL cholesterol  
LDL-P LDL particle  
LLD lower limit of detection  
SHBG sex hormone binding globulin  
SWAN Study of Women's Health Across the Nation  
VLDL-P VLDL particle

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