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Postmenopausal African-American Women

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PURPOSE: To determine the effects of cardiorespiratory fitness level and risk factors for metabolic syndrome (MetS) in postmenopausal African-American women on serum-induced endothelial migration rate and circulating microRNAs. **METHODS:** Overweight, sedentary, African-American, postmenopausal women and habitual physical activity-matched, healthy, young women were recruited. Blood was drawn and serum frozen at -80°C. Participants completed a VO_{2max} test on a treadmill. Postmenopausal women were grouped based on their number of MetS risk factors (0-5) and VO_{2peak} (very low < 18 mL·kg⁻¹·min⁻¹ [n=25], low = 18–22 mL·kg⁻¹·min⁻¹ [n=21], or moderate > 22 mL·kg⁻¹·min⁻¹ [n=16]). Human umbilical vein endothelial cells (HUVECs) were exposed to 5% serum of each subject in a 96-well plate radius migration assay and migration to cover a simulated “wound” area was tracked over 24 hours. Total RNA was isolated from fresh sera and a priori chosen microRNAs were quantified by real-time PCR. **RESULTS:** Serum of postmenopausal women with moderate cardiorespiratory fitness induced greater migration than serum of women with low or very low fitness levels at 16 hr (79% vs. 59% and 59%, p<0.01) and 24 hr (87% vs. 68% and 69%, p<0.05). Migration in response to serum from the young, healthy group was higher than the low and very low fitness groups after 8, 16, and 24 hr (p<0.05), but was not different from the moderately fit group at any time point. Migration in response to serum from postmenopausal women with 0–1 risk factor for MetS (n=18) compared to those with 2–3 (n=37) and 4–5 (n=6) was greater after 16 hr (75% vs. 62% vs. 42%, p<0.05) and 24 hr (85% vs. 70% vs. 54%, p<0.05). Significant negative correlations with migration were found for total cholesterol (r=-0.24), LDL (r=-0.25), and triglycerides (r=-0.25) (p<0.05). Circulating microRNAs 126, 21, and 221 all correlated negatively with VO_{2peak} (r=-0.21–-0.26, p<0.05) and approached significant correlations with LDL (r=-0.22–-0.24, p=0.06–0.09). **CONCLUSIONS:** Factors which impair endothelial cell migration rate are present in serum of overweight, postmenopausal, African American women. Having a moderate cardiorespiratory fitness may be protective, while having as few as two risk factors for MetS may relate to detriments in endothelial repair functions.

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