Acute Responses in Agonists of uEGF to Moderate-Intensity and High-Intensity Interval Exercise in Mid-Spectrum CKD

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ABSTRACT

Urine epidermal growth factor (uEGF) is a novel biomarker utilized in assessing renal health in various renal diseases, specifically chronic kidney disease (CKD). uEGF promotes multiple intracellular pathways, stimulating renal cell growth, survival, and replication. uEGF production is activated by multiple agonists that bind to the uEGF receptor. Aerobic exercise initiates the upregulation of several of these agonists to increase the production of uEGF. Depending on the mode and intensity of aerobic exercise, uEGF agonists may activate differently in CKD populations. **PURPOSE**: To determine the influence of an acute bout of steady-state exercise (SSE) and high-intensity interval exercise (HIIE) on concentrations of uEGF agonists (serum insulin-like growth factor 1 (IGF-1), angiotensin II receptor type 1 (AGTR-1), and transforming growth factor beta 1 (TGF-β1)) in mid-spectrum CKD. **METHODS**: Twenty participants (n = 6 men; n = 14 women; age 62.0 $\pm$ 9.9 yr; weight 80.9 $\pm$ 16.2 kg; body fat 37.3 $\pm$ 8.5% of weight; VO_2max 19.4 $\pm$ 4.7 ml/kg/min) completed 30 min of SSE at 65% VO_2reserve or HIIE by treadmill walking (90% and 20% of VO_2reserve in 3:2 min ratio) in a randomized crossover design. Both exercise conditions averaged ~ 65% VO_2reserve. Blood and urine samples were obtained under standardized conditions just before, 1hr, and 24hrs after exercise. uEGF (ng/mL), serum IGF-1 (ng/mL), AGTR-1 (ng/mL), and TGF-β1 (pg/mL) responses were analyzed using 2 (condition) by 3 (sample point) repeated measures ANOVAs and Pearson Correlations. **RESULTS**: Serum IGF-1 and AGTR-1 increased 1hr and 24hr post-exercise in both exercise conditions; however, statistical significance was not achieved (p = 0.28 and p = 0.09). Similarly, serum TGF-β1 decreased at 24hrs in both exercise conditions but statistically remained unaltered (p = 0.42). IGF-1 was significantly correlated to uEGF in both conditions at all three-time points (p = 0.03), while AGTR-1 was significantly correlated to uEGF at 1hr in HIIE. uEGF findings were previously reported in ACSM abstract (DOI: 10.1249/01.mss.0000560710.72569.11). **CONCLUSION**: Agonists of uEGF remained unaltered following an acute bout of SSE and HIIE in mid-spectrum CKD. Further research is needed to understand better uEGF response activation to aerobic exercise in mid-spectrum CKD.