The purpose of this investigation was to determine the relationship between physiological variables and Sprint (750m swim, 20km cycle, 5km run) or Olympic (1.5km swim, 40km cycle, 10km run) distance triathlon performance. Twenty international (12 male and 8 female) triathletes (age, 24.3 ± 3.6yrs, height, 1.72 ± 0.09m, body mass 66.5 ± 4.2kg, mean ± S.D.) underwent laboratory assessments for the determination of maximal power output (PPO) and maximal oxygen uptake (\(\dot{V}O_2\)max) during an incremental cycle test to exhaustion, and a maximal treadmill running test to assess peak running velocity (\(V_{max}\)) and maximal oxygen uptake (\(\dot{V}O_2\)max). In addition, submaximal steady-state measures of oxygen uptake (\(\dot{V}O_2\)), blood lactate concentration and heart rate were determined during the cycling and running assessments. Physiological variables were compared with the best performance time recorded within 4 weeks of the assessments for both triathlon distances. Variables most related to Sprint distance performance were maximal power output (\(r = -0.67, p<0.05\)) and power at lactate threshold (\(r = -0.77, p<0.05\)) during cycling and peak treadmill running velocity (\(r = -0.79, p<0.05\)). Similar relationships were observed between these variables and Olympic distance performance (PPO, \(r = -0.79, p<0.05\), power at lactate threshold, \(r = -0.75, p<0.05\), \(V_{max}\), \(r = -0.70, p<0.05\)) as well as \(\dot{V}O_2\)max (\(r= -0.86, p<0.05\)) during cycling and velocity at \(\dot{V}O_2\)max (\(\dot{W}O_2\)max) (\(r = -0.62, p<0.05\)) during running. Stepwise multiple regression analysis revealed a good relationship between predicted race time and actual race time for both Sprint and Olympic distance events. Thus, commonly assessed physiological parameters can be used to predict performance in elite international triathlon.

**Keywords:** Triathlon, Applied Physiology