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### THE EFFECTS OF COUNTDOWN BEFORE VOLUNTARY EXERCISE ON MUSCLE SYMPATHETIC NERVE ACTIVITY AND BLOOD FLOW ARE ALTERED BY POSTURAL CHANGE

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We previously examined the effects of countdown (CD) for 30 sec before voluntary bicycle ergometer exercise on the cardiovascular responses and reported that the CD increased middle cerebral artery blood flow velocity, heart rate (HR) and cardiac output (CO), while decreased total peripheral resistance (TPR) with increased oxygen saturation in the muscle tissue (StO<sub>2</sub>). In the present study, we examined whether the CD decreased muscle sympathetic nerve activity (MSNA) and whether these responses to the CD were abolished by the postural change from the semi-recumbent to supine position.

For the first study, we asked 7 young healthy men to perform voluntary cycle ergometer exercise using only right leg in the semi-recumbent position, and from 120 sec before starting exercise, we continuously measured MSNA in the peroneal nerve of the non-active (left) leg together with HR (ECG), blood pressures (Finometer), and StO<sub>2</sub> (near-infrared spectrometry) of the thigh muscle of active leg (right). The subjects repeated 8 trials with this protocol, intermitted by more than 5-min rest. In 4 trials randomly selected from the 8 trials, the onset of exercise was signaled by a 30-s CD, whereas in the remaining 4 trials, exercise started without CD. For the second study, using another group of 6 young subjects, we performed the same protocol of the measurements in the supine position.

We found that the CD decreased total MSNA (a product of amplitude and burst frequency) with increased HR, CO, and StO<sub>2</sub> and decreased TPR and that these responses to the CD were abolished by the postural change from the semi-recumbent to the supine position.

Thus, the CD before starting voluntary exercise suppressed MSNA to cause muscle vasodilation but this response was abolished by the postural change from the semi-recumbent to the supine position.

**Key words:** voluntary exercise, central command, muscle sympathetic nerve activity, muscle blood flow