CHAPTER 4

Results

1. Physical characteristics of subjects

Table 4.1 shows physical characteristics of subject in sedentary and high physical fitness groups. The subjects in high physical fitness group had a significantly higher height and lower oral temperature than those subjects in the sedentary group. However, there were no significant differences for other physical characteristics.

Table 4.1 Physical characteristics of subject

Variable	**Sedentary group**	**High physical fitness group**
Age (years)	10.69 ± 0.30	10.10 ± 0.19
Height (cm)	136.39 ± 0.97	139.96 ±1.28*
Weight (kg)	32.95 ± 1.23	32.95 ± 1.24
Oral temperature (**°C)**	37.06 ± 0.09	36.75 ± 0.08*
Skin temperature of forearm(**°C**)	31.77 ± 0.26	31.76 ± 0.21
Skin temperature of thigh (**°C**)	30.69± 0.27	30.92 ± 0.22
Skinfold thickness of triceps (mm)	14.99 ± 0.85	13.74 ± 0.70
Skinfold thickness of subscapularis (mm)	14.18 ± 1.04	12.14 ± 0.42

Data are expressed as mean ± S.E.M. for 18 sedentary subjects and 16 high physical fitness subjects. ***** $p < 0.05$ *vs* sedentary group.

2. Exercise test to separate between high physical fitness and sedentary groups.

Maximum oxygen uptake (VO_{2max}) value was significantly higher in the high physical fitness group (51.25 $\pm$ 0.88 mL · kg^{-1}· min^{-1}) than that in the sedentary group (39.26 $\pm$ 1.47 mL · kg^{-1}· min^{-1}) (Figure 4.1).

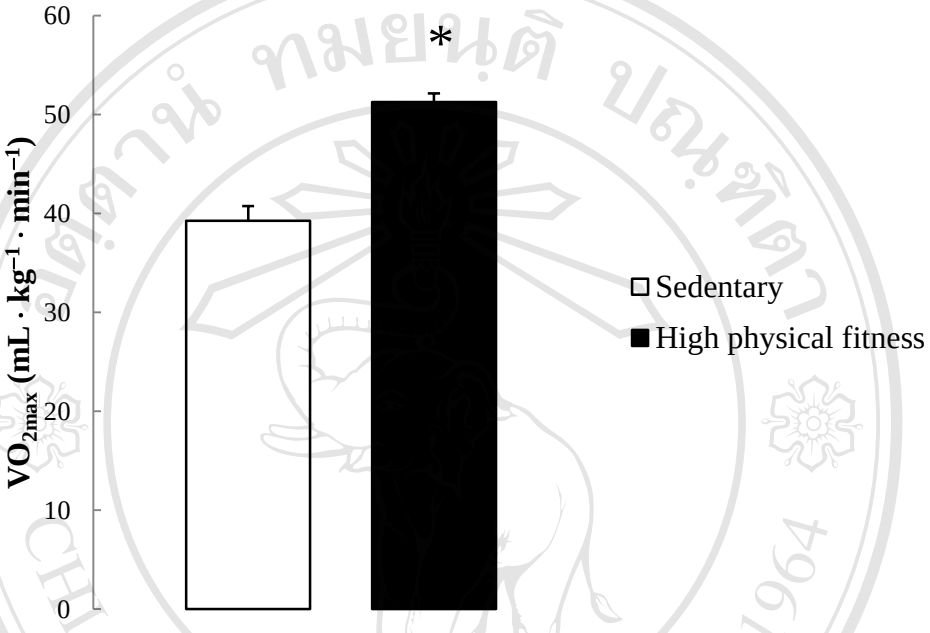

Figure 4.1 Maximum oxygen uptake (VO_{2max}) of subjects in sedentary and high physical fitness groups. Data are expressed as mean ± S.E.M. for 18 sedentary subjects and 16 high physical fitness subjects. ***** $p < 0.05$ *vs* sedentary group.

3. Sweat rate due to indirect ACh-mediated sweat gland activation (AXR)

Forearm sweat rate due to indirect ACh-mediated sweat gland activation (AXR) was significantly higher in the high physical fitness group (0.70 ± 0.10 mg· cm^{-2}·min^{-1}) than that in the sedentary group (0.38 ± 0.05 mg· cm^{-2}·min^{-1}). AXR sweat rate for thigh was significantly higher in the high physical fitness group (0.61 ± 0.06 mg· cm^{-2}·min^{-1}) than that in the sedentary group (0.40 ± 0.07 mg· cm^{-2}·min^{-1}) (Figure 4.2).

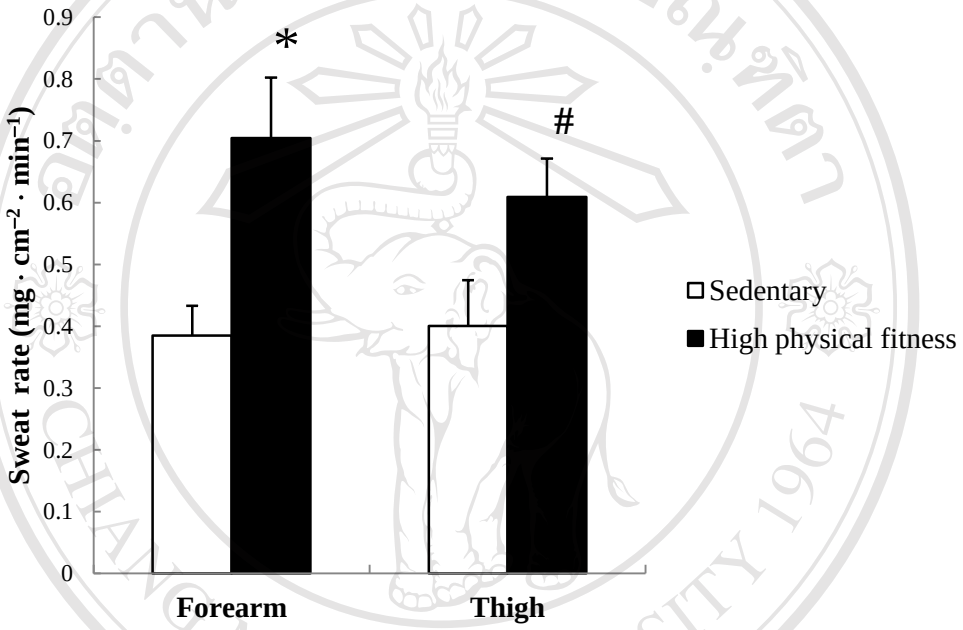

Figure 4.2 Sweat rate for the forearm and thigh due to indirect ACh-mediated sweat gland activation (AXR) in the sedentary and high physical fitness groups. Data are expressed as mean ± S.E.M. for 18 sedentary subjects and 16 high physical fitness subjects. ***** $p < 0.05$ *vs* forearm-sedentary group, $^{\#}$ $p < 0.05$ *vs* thigh-sedentary group.

4. Sweat rate due to direct ACh-mediated sweat gland activation (DIR)

Forearm sweat rate due to direct ACh-mediated sweat gland activation (DIR) was significantly higher in the high physical fitness group (0.54 ± 0.03 mg· cm^{-2}·min^{-1}) than that in the sedentary group (0.34 ± 0.02 mg· cm^{-2}·min^{-1}). DIR sweat rate for thigh was significantly higher in the high physical fitness group (0.43 ± 0.03 mg· cm^{-2}·min^{-1}) than that in the sedentary group (0.29 ± 0.02 mg· cm^{-2}·min^{-1}). DIR sweat rate of high physical fitness subjects were significantly lower in thigh than in forearm (Figure 4.3).

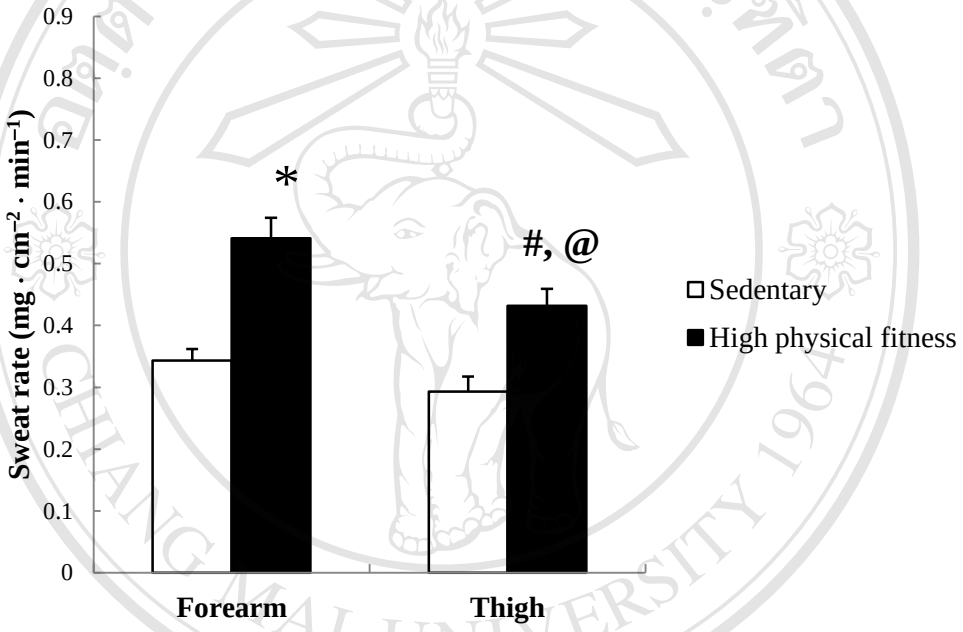

Figure 4.3 Sweat rate for the forearm and thigh due to direct ACh-mediated sweat gland activation (DIR) in the sedentary and high physical fitness groups. Data are expressed as mean ± S.E.M. for 18 sedentary subjects and 16 high physical fitness subjects. ***** $p < 0.05$ *vs* forearm-sedentary group, $^{\#}$ $p < 0.05$ *vs* thigh-sedentary group, $^{@}$ $p < 0.05$ *vs* forearm-thigh physical fitness group.

5. Activated sweat gland density (ASG)

The activated sweat gland density (ASG) for forearm was significantly higher in the high physical fitness group (190.13 ± 7.51 glands/cm^2) than that in the sedentary group (155.82 ± 7.01 glands/cm^2). ASG for thigh was significantly higher in the high physical fitness group (137.98 ± 5.21 glands/cm^2) than that in the sedentary group (117.81 ± 6.98 glands/cm^2). ASG of both sedentary and high physical fitness subjects were significantly lower in thigh than in forearm (Figure 4.4).

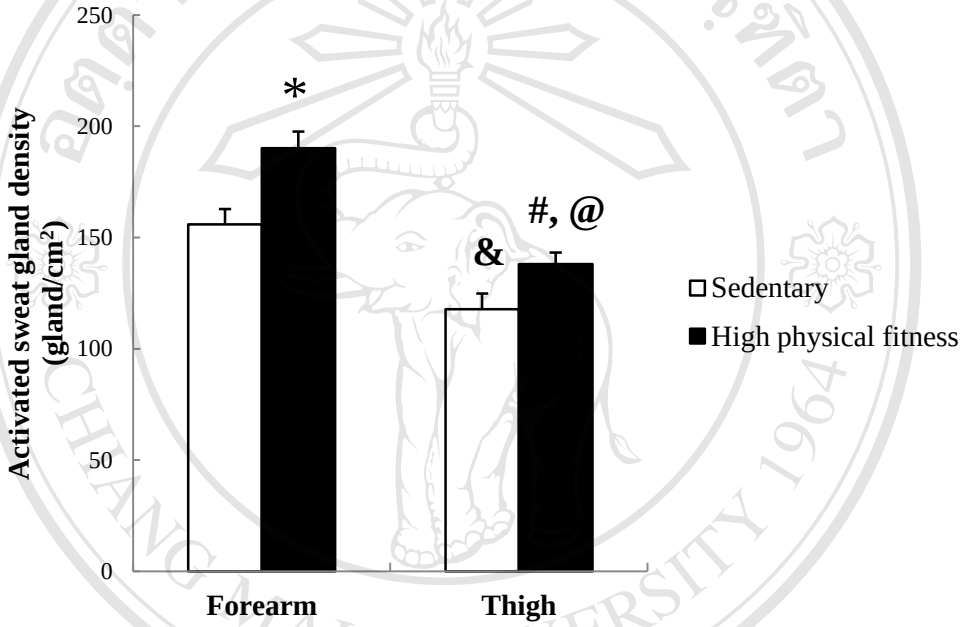

Figure 4.4 Active sweat gland densities for the forearm and thigh in the sedentary and high physical fitness groups. Data are expressed as mean ± S.E.M. for 18 sedentary subjects and 16 high physical fitness subjects. ***** $p < 0.05$ *vs* forearm-sedentary group, $^{\#}$ $p < 0.05$ *vs* thigh-sedentary group, $^{\&}$ $p < 0.05$ *vs* forearm-sedentary group, $^{@}$ $p < 0.05$ *vs* forearm-high physical fitness group.

6. Activated sweat output per gland (SGO)

The sweat output per gland (SGO) for the forearm was significantly higher in the high physical fitness group (2.88 ± 0.18 μg· min^{-1}·$gland^{-1}$) than that in the sedentary group (2.23 ± 0.12 μg· min^{-1}·$gland^{-1}$) (Figure 4.5). At the thigh, no significance difference was found between the groups (sedentary, 2.57 + 0.23 μg· min^{-1}·$gland^{-1}$; high physical fitness, 3.17 + 0.20 μg· min^{-1}·$gland^{-1}$).

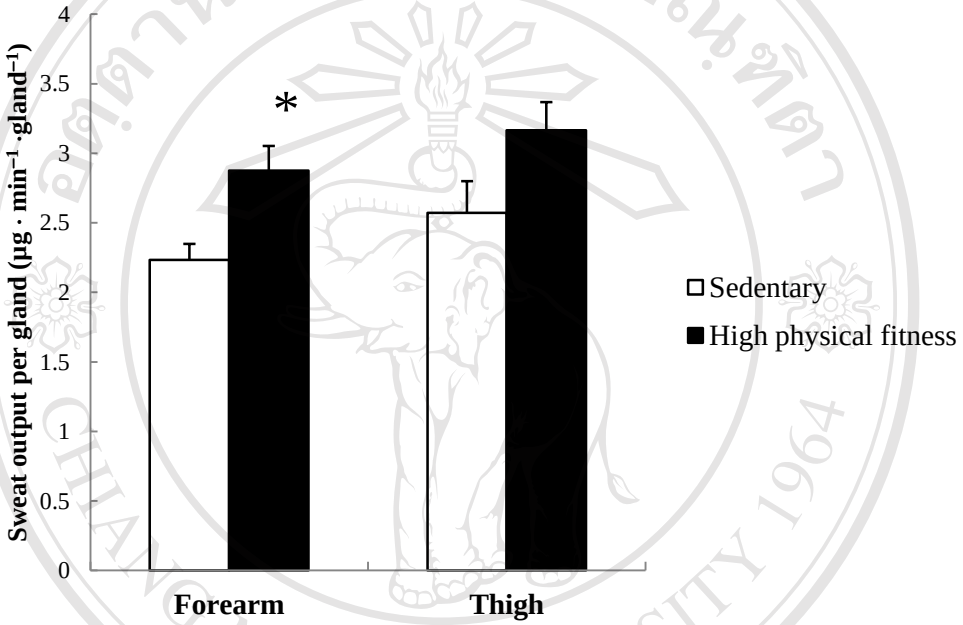

Figure 4.5 Sweat output per gland for the forearm and thigh in the sedentary and high physical fitness groups. Data are expressed as mean ± S.E.M. for 18 sedentary subjects and 16 high physical fitness subjects. ***** $p < 0.05$ *vs* forearm-sedentary group.