資料　1－3

運動と喫煙について

（加賀谷委員提出資料）

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第 21 回厚生科学審議会地域保健健康増進栄養部会資料

運動と喫煙について

＜習慣的喫煙により血管内皮細胞由来の血管拡張機能が損なわれる＞

Gaenzer H, Neumayr G, Marschang P, Sturm W, Kirchmair R, and Patsch JR: Flow-mediated vasodilation of the femoral and brachial artery induced by exercise in healthy nonsmoking and smoking men. J Am Coll Cardiol 38:13-19, 2001.

習慣的喫煙男性８名と非喫煙者 10 名（31-50 歳）に最大下の自転車エルゴメータ運動（100w*20 分＋150w*20 分）を 40 分間行わせて、大腿動脈血管径の拡大を比較したところ、喫煙者の方が低かった（9.2±1.9% vs 4.8±16.%）。また、前腕を閉塞して解放した時の上腕動脈の流量依存性血管拡張能（FMD）も喫煙者で低いこと、それは全身運動中の血管拡張と高い相関（r=0.88, p<0.001）があった。煙者の運動時血管拡張能の低下は、喫煙による内皮細胞機能の損傷が原因であることを示している。

Stoner L, Sabatier M, Edge K, and McCully K: Relationship between blood velocity and conduit artery diameter and the effects of smoking on vascular responsiveness. J Appl Physiol 96: 2139-2145, 2004.

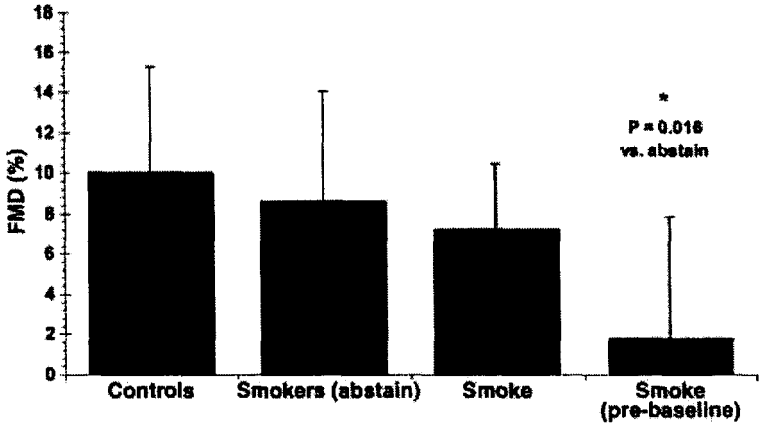

Fig. 3. Flow-mediated dilation (FMD) values for control subjects (average of 2 days) and smokers pre- (abstain) and postsmoking. For the postsmoking condition we calculated FMD using both the presmoking and postsmoking baseline diameters. Bars represent SD for each data point.

Iwado Y., Yoshinaga K., Furuyama H., Ito Y., Noriyasu K., Katoh C., Kuge Y., Tsukamoto E., and Tamaki N.: Decreased endothelium-dependent coronary vasomotion in healthy young smokers. Eur J Nucl Med Mol Imaging. 29:984-990, 2002.

RPP (rate pressure product)で正規化された冠状動脈・心筋の血流は喫煙者で有意に低下。

＜習慣的喫煙により運動時の血流自動調節が損なわれる＞

Wimpissinger B, Resch H, Berisha F, Weigert G, Polak K, Schmetterer L. : Effects of isometric exercise on subfoveal choroidal blood flow in smokers and nonsmokers. Invest Ophthalmol Vis Sci. 44(11):4859-4863, 2003.

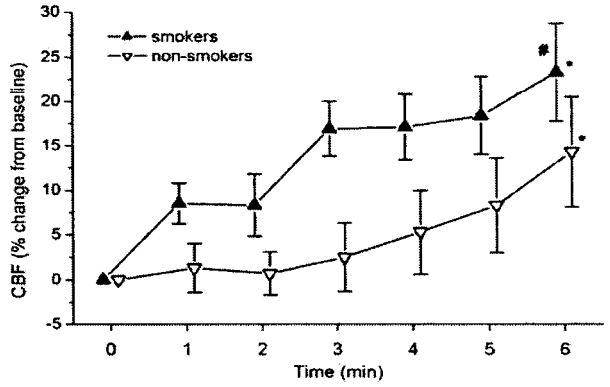

FIGURE 1. Relative change of CBF during squatting compared with the pre-exercise value. Data are presented as means ± SEM (n = 12, each). *Significant difference versus baseline (one-way ANOVA, post hoc testing); #significant difference between smokers and nonsmokers (ANOVA, interaction between time and group).

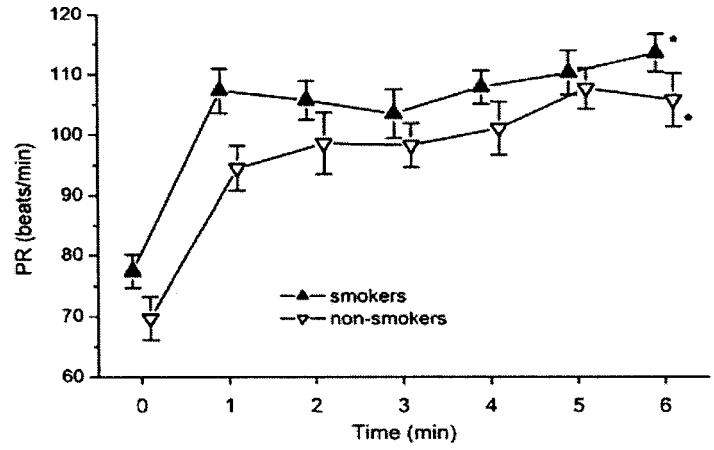

FIGURE 3. The effect of isometric exercise on PR. Data are presented as means ± SEM (n = 12, each). *Significant difference versus baseline (one-way ANOVA, post hoc testing).

〈喫煙が（運動時の）身体に与える一過性の影響〉 交感神経活動を亢進する

Circulation. 1998 Aug 11;98(6):528-34. Related Articles, Links:

Cigarette smoking increases sympathetic outflow in humans.

Narkiewicz K, van de Borne PJ, Hausberg M, Cooley RL, Winniford MD, Davison DE, Somers VK.

皮膚交感神経活動の亢進

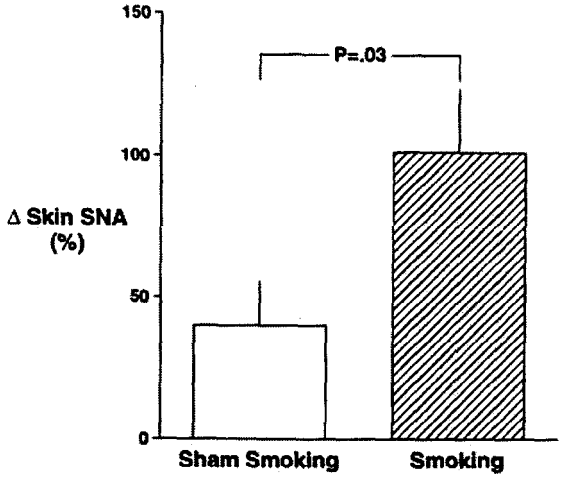

Figure 5. Average changes in skin SNA during sham smoking and smoking (n=9). Both sham smoking and smoking caused significant increases in skin SNA ($P<0.001$ and $P=0.04$, respectively). The increase in skin SNA was significantly greater during smoking than sham smoking. Data are mean±SEM.

＜喫煙は運動パフォーマンスを低下させる＞

Karpovich PV, and Hale CJ: Tobacco smoking and physical performance. J Appl. Phsioll. 3:616-621, 1951. 習慣的喫煙者８名と非喫煙者５名の自転車エルゴメータ運動の成績調べると喫煙日より非喫煙日の方が成績が低下した。

Louie D: The effects of cigarette smoking on cardiopulmonary function and exercise tolerance in teenagers. Can Respir J 8:289-298, 2001. Teenagerd でも喫煙は呼吸循環機能と持久性パフォーマンスに影響を与える。

＜習慣的喫煙者も運動すると血管への悪影響が抑制される＞

Anton MM, Cortez-Cooper MY, Devan AE, Neidre DB, Cook JN, Tanaka H. : Cigarette smoking, regular exercise, and peripheral blood flow. Atherosclerosis 185:201-205. 2006.

加賀谷 3/2/06