

Analysis of endocrine-metabolic systems during exercise and clinical applications of exercise for laboratory test.

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1991 Fiscal Year Final Research Report Summary

Analysis of endocrine-metabolic systems during exercise and clinical applications of exercise for laboratory test.

Research Project

Project/Area Number

02671067

Research Category

Grant-in-Aid for General Scientific Research (C)

Allocation Type

Single-year Grants

Research Field

Laboratory medicine

Research Institution

Kanazawa University

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Keywords

Exercise testing / Hormones / Endocrinology / Chemical substances / physiological Test / hypothalamo-pituitary function test / Laboratory medicine / Ergometer

Research Abstract

Exercise can affect numerous biochemical variables. We consider it is very important to clarify the effect of exercise(short-term exercise e. g. a bicycle ergometer at 60% VO₂max for 15 min.) in order to establish a reliable physiological loading test in the clinical laboratory fields. We therefore decided to investigate 1)the effect exercise on endocrinological organs 2)the effect of exercise on the blood chemical variables(laboratory tests)3)the simultaneous effect of the hormonal changes on the blood chemistry and the relationship between them. One hundred and thirty male students, aged 23-26 yr, were subjected to exercise on a bicycle ergometer at 60% VO₂max for 15 min. Blood was collected just before and immediately after exercise. Plasma catecholamines(adrenaline(AD), noradrenaline(NAD)and dopamine)were measured using the HPLC method. Other serum hormones were measured by RIA

or EIA and 70 serum chemicals were determined by routine methods. After exercise, mean AD, NAD, ACTH, PRL, GH, TSH, Aldosterone, renin, cortisol, gulcagon, FT_3, FT_4, PTH, osteocalcin, ADH, HANP, somatomedine C, Vitamine D_3, erythropoietin, and thyroxine binding globulin(TBG)showed a significant increase. On the other hand, serum calcitonin, insulin and c-peptide decreased signifidantly. Dopamine, LH, FSH, estradiol, somatostatin, motilin, VIP, CCK, secretin, substance P and neurotensin showed no change. Thirty two out of 70 chemical substances(enzymes, lipids and electrolytes etc.)were significantly increased but 4 decreased. The greatest increase was in NEFA(non-estrified free fatty acid)and the greatest decrease was in chylomicrons. The relationship of % changes of all determinants was calculated using a computer. Many correlations between hormones and biochemical components were found. For example, we revealed 24 correlations between thyroid and parathyroid hormones and biochemical components. We firstly demonstrated the importance of FT3 not only in protein metabolism but also in lipid metabolism. Further studies on exercise-induced hormonal change and the interrelationship between hormones and biochemical variables should be carried out.▲ Less

Research Products (16 results)

		All	Other
All	Publications (16 results)		
[Publications]	Takuma Hashimoto: "Clinicl evaluation of accuracy in determinig serum free thyroxine and free triiodothyronine in patients with non-thyroidal illness:immunoglobulin effect on T_3/TBG ratio and T_4/TBG ratio." Endocrinol.Japon.38. 633-639 (1991)		▼
[Publications]	Takuma Hashimoto: "Evaluation of a new chemiluminescence technique for human thyrotropin(Berilux hTSH);Diagnostic value of five immunometric assay methods." Eur.J.Clin.Chem.Clin.Biochem. 29. 753-757 (1991)		▼
[Publications]	Takuma Hashimoto: "Studies on endocrine change induced by 8 MHz locl radiofrequency hyperthermia in patients with bladder cancer." Int.J.Hyperthermia. 7. 551-557 (1991)		▼
[Publications]	Takuma Hashimoto: "The Importance of primary quality control;Improving detection of low thyroxine-binding globulin levels using commercial TBG radioimmunoassay kits." JJCLA. 16. 29-33 (1991)		▼
[Publications]	橋本 琢磨: "下垂体－甲状腺ホルモン測定法における最近の進歩－non RI法の普及と評価－" 臨床病理. 39:9. 913-919 (1991)		▼
[Publications]	橋本 琢磨: "運動負荷テスト時におけるホルモン値の変動とbiochemical indicesの相関" ホルモンと臨床 特集/運動と内分泌機能.		▼
[Publications]	Takuma Hashimoto: "The effect of exercise on pituitary-thyroid and parathyroid function.Proceedings of the 5th Asian-Pacific Congress of Clinical Biochemistry." Excerpta Medica,		▼
[Publications]	Takuma Hashimoto: "The effect of exercise on the results of clinical laboratory tests.Proceedings of the 5th Asina-Pacific Congress of Clinical Biochemistry." Excerpta Medica,		▼
[Publications]	Takuma Hashimoto et al.: "Clinicl evaluation of accuracy in determining serum free thyroxine and free triiodothyronine in patients with non-thyroidal illness : immunoglobulin effect on T_3/TBG ratio and T_4/TBG ratio." Endocrinol. Japon.38. 633-639 (1991)		▼
[Publications]	Takuma Hashimoto et al.: "Evaluation of a new chemiluminescence technique for human thyrotropin (Berilux hTSH) ; Diagnostic value of five immunometric assay methods." Eur. J. Clin. Chem. Clin. Biochem. 29. 753-757 (1991)		▼
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[Publications]	Takuma Hashimoto et al.: "The Importance of primary quality control ; Improving detection of low thyroxine-binding globulin levels using commercial TBG radioimmunoassay kits." JJCLA. 16. 29-33 (1991)		▼
[Publications]	Takuma Hashimoto et al.: "Recent Developments of Measurements for Pituitary-Thyroid Hormones : Evaluation of Five Immunometric Assay Methods (RI and non RI methods)" Jpn. J. Clin. Pathol.39. 913-919 (1991)		▼
[Publications]	Takuma Hashimoto et al.: "Interrelationships between the hormonal changes and biochemical indices during exercise in healthy male subjects." Clinical Endocrinology.		▼
[Publications]	Takuma Hashimoto et al.: "The effect of exercise on pituitary-thyroid and parathyroid function." Proceedings of the 5th Asian-Pacific Congress of Clinical Biochemistry.Excerpta Medica.		▼
[Publications]	Takuma Hashimoto et al.: "The effect of exercise on the results of clinical laboratory tests." Proceedings of the 5th Asian-Pacific Congress of Clinical Biochemistry.Excerpta Medica.		▼

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