

Role of exercise on formation of myotube at regeneration of muscle

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1997 Fiscal Year Final Research Report Summary

Role of exercise on formation of myotube at regeneration of muscle

Research Project

Project/Area Number

08457385

Research Category

Grant-in-Aid for Scientific Research (B)

Allocation Type

Single-year Grants

Section

一般

Research Field

Orthopaedic surgery

Research Institution

Kanazawa University

Principal Investigator

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Project Period (FY)

1996 - 1997

Keywords

skeletal muscle / regeneration / aging / exercise / myotube / satellite cell / tenotomy

Research Abstract

The following experiments were done to study the regenerative ability though how to modified by aging, continuous tension, and exercise to rat skeletal muscle.

1. Change by aging. Bupivacaine was injected into the anterior tibial muscles of 2-year-old rats. The induced degeneration-regeneration was slow, taking 3 weeks to completion (1 week in young rats). The reconstituted muscle showed small fiber size, an increased number of internal nuclei.

2. Influence of synergistic tenotomy. Bupivacaine was injected into the extensor digitorum longus muscle after tenotomy of anterior tibial muscle. Tenotomized muscle gained maturation for 5-6 weeks. The regenerating process was slower in the tenotomized muscle than in the control muscle.

3. Effect of exercise on regeneration. The effect of exercise during regeneration process on satellite cell activation was studied. It was found that satellite cells in these muscles were synthesizing DNA 30 h after bupivacaine treatment. Respectively, this was 18 h earlier than found on non-exercising muscle. Satellite cells are activated earlier and muscle fibers mature more rapidly.

It was confirmed that the constant contraction and relaxation of the exercising muscles was effective in the restoration and the promotion of maturity on regenerating muscle.

Research Products (9 results)

All Other

All Publications (9 results)

[Publications] 灰田 信英: "骨格筋の再生におよぼす加齢の影響" 理学療法学. 25. (1998) ▼

[Publications] 灰田 信英: "骨格筋の再生におよぼす運動療法の効果" 理学療法学. 25. (1998) ▼

[Publications] Yamazaki, T: "Effect of short duration stretching for prevention of disuse atrophy in mature rat" Jap.J.Phys.Ther.23. 349-354 (1996) ▼

[Publications] 灰田 信英: "骨格筋タンパク質の代謝と運動" 理学療法共庫. 2. 63-67 (1996) ▼

[Publications] Haida N, Yamazaki T: "Effects of aging on skeletal muscle regeneration" Jpn J Phys Ther. 25 (in press). (1998) ▼

[Publications] Haida N, Yamazaki T: "Effects of therapeutic exercise during skeletal muscle regeneration" Jpn J Phys Ther. 25 (in press). (1998) ▼

[Publications] Yamazaki T, Haida N et al: "Effect of short duration stretching for prevention of disuse atrophy in mature rats" Jpn J Phys Ther. 23. 349-354 (1996) ▼

[Publications] Haida N: "Protein metabolism and therapeutic exercise" RigakuRyohou Hyougo. 2. 63-67 (1996) ▼

[Publications] Sugama S, Haida N et al: "The effect of immobilization on muscle and tendon collagen solubility-biochemical studies on collagen from rat muscle and tendon tissues-" Jpn J Phys Ther. 23. 72-79 (1996) ▼

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