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原著

アレルゲン胃内投与後の急性運動が感作マウスのアレルゲンの消化性とアナフィラキシー症状に及ぼす影響

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Anaphylaxis and Reduced Digestibility of Allergen due to Acute Exercise in mice Sensitized with Intragastric Injections of Allergen

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Abstract

Eighteen BALB/c mice were separated into three groups : sensitized-exercise (SE, n=6),

sensitized-rest (SR, n=6), and control (CE, n=6) groups. The SE and SR groups were sensitized with three weekly injections of ovalbumin (OVA) in Al (OH) 3. OVA specific IgE and total IgE values increased 2--3 fold in the sensitized group compared to the controls. The SE and control groups were subjected to treadmill running at a 5% grade for 30 min immediately after immediately intragastric injection of OVA. Hypersensitivity responses were measured 30 min after running. The SR group was not subjected to the running. Protein digestion in vivo and tissue damage in the small intestine membrane were compared between the SE and SR groups. More hydrolytic cleavages of OVA with antigenic activity were detect in the intestines of the SE group. The mice of the SE group showed more anaphylactic symptoms such as scratching and reduced physical activity. Some intestinal mucosal lesions were observed in the SE group with scanning electron microscopy but not in SR group. The above results suggest that acute exercise after intragastric injection of allergenic protein induce hypersensitivity responses in sensitized mice resulting from lower digestion and injuries to intestinal tissues.

要 約

18匹のBALB/cマウスを感作・運動群（SE, n=6），感作・安静群（SR, n=6），コントロール群（CE, n=6）の3群に分けた．SEとCEの2群にはオボアルブミン（OVA）/水酸化アルミニウムを1週間ごとに3回免疫した．コントロール群と比較するとOVA特異IgE値と総IgE値が2～3倍高く上昇した．SE群とCE群はOVAを胃内投与した直後に傾斜5%，30分間のトレッドミル走を負荷した．運動負荷後にアレルギー反応を30分間観察した．SR群にはPBSを胃内投与し，運動負荷は行わなかった．感作したマウスの生体内でのタンパク質消化性と小腸粘膜組織の傷害を運動負荷の有無で比較するとSR群に比べてSE群の小腸内部には抗原性を保持したOVA加水分解物か多く残存している傾向が認められた．SE群マウスは引っ掻いたり動きが鈍くなるようなアナフィラキシー症状が観察された．小腸粘膜上皮組織を走査電子顕微鏡で観察するとSE群では小腸の傷害が観察されたが，SR群では傷害が認められなかった．以上の結果から，アレルゲンタンパク質胃内投与後に中等度急性運動を負荷と消化能力の低下と小腸組織の傷害によって感作マウスはアレルギー症状を引き起こす可能性が示唆された．