Comparison of the Role of Arachidonic Acid and Histamine on The Smooth Muscle Myosin Activities in Different States

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SUMMARY. Our previous studies indicated that there are three states of smooth muscle myosin including Ca2+/CaM-dependent phosphorylation of myosin (CDPM), Ca2+/calmodulin (CaM)-independent phosphorylation of myosin light chains (CIPM), and unphosphorylated myosin. In this study, we compared the effects of histamine and arachidonic acid (AA) on the smooth muscle myosin activities in the three different states. Our research showed that histamine and AA play different roles on the activity of smooth muscle myosin depending on the specific state of myosin. Both histamine and AA increased the Mg2+-ATPase activities and phosphorylated extents of CDPM by MLCK, but AA and histamine showed different effects on the myosin function of CIPM or unphosphorylated myosin in purified states. In particular, AA increased the Mg2+-ATPase activities and phosphorylated extents of CIPM by MLCK, and stimulated the Mg2+-ATPase activities of unphosphorylated myosin in purified states. However, histamine did not apparently influence Mg2+-ATPase activities of CIPM or unphosphorylated myosin, and did not significantly increase the phosphorylation extents of CIPM.

KEYWORDS: arachidonic acid, histamine, myosin Mg2+-ATPase activity, smooth muscle myosin phosphorylation.

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