

## Effects of the Lectin Concanavalin-A on the Regulation of Second Messengers and Parathyroid Hormone Release by Extracellular $\text{Ca}^{2+}$ in Bovine Parathyroid Cells\*

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### Abstract

The lectin Concanavalin-A (Con-A) binds to cell surface carbohydrate-containing moieties and modulates the function of a variety of glycoprotein receptors. Since extracellular calcium ( $\text{Ca}^{2+}$ ) may regulate parathyroid function by a receptor-like process, we examined the effects of Con-A on various aspects of  $\text{Ca}^{2+}$ -regulated parathyroid function. We recently showed that Con-A significantly reduces the inhibitory effects of high  $\text{Ca}^{2+}$  on dopamine as well as isoproterenol- and forskolin-stimulated cAMP accumulation. In our present studies Con-A similarly reduced the inhibitory effect of 2.0 mM  $\text{Ca}^{2+}$  on PTH release from  $60 \pm 6\%$  to  $40 \pm 6\%$  and increased the setpoint for  $\text{Ca}^{2+}$ -regulated PTH release from 1.25 to 1.8 mM. This effect was dose dependent. Con-A also inhibited the  $\text{Ca}^{2+}$ -stimulated accumulation of inositol phosphates by 50–60% in association with a marked reduction in the high  $\text{Mg}^{2+}$ -evoked spike in cytosolic  $\text{Ca}^{2+}$  as well as a significant decrease in the sustained rise in cytosolic  $\text{Ca}^{2+}$  at 2–3 mM extracellular  $\text{Ca}^{2+}$ . These data provide further evidence for a key role for cell surface carbohydrate-containing moieties in the mechanism through which parathyroid cells "sense"  $\text{Ca}^{2+}$  and, in turn, regulate PTH release, phosphoinositide turnover, and the release of intracellular  $\text{Ca}^{2+}$  stores. It is possible that the putative  $\text{Ca}^{2+}$  receptor is a glycoprotein or is closely associated with glycoproteins or other moieties containing  $\alpha$ -methyl-D-glucoside or  $\alpha$ -methyl-D-mannoside residues. (*Endocrinology* **128**: 2931–2936, 1991)

### Footnotes

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