Molecular cloning and hormonal regulation of PiT-1,
a sodium-dependent phosphate cotransporter from rat parathyroid glands

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The extracellular concentration of inorganic phosphate (P_i) is an important determinant of parathyroid cell function. The effects of P_i may be mediated through specific molecules in the parathyroid cell membrane, one candidate molecule for which would be a Na^+-dependent P_i cotransporter. A cDNA encoding a Na^+-P_i cotransporter, termed rat PiT-1, has now been isolated from rat parathyroid. The 2890-bp cDNA encodes a protein of 681 amino acids that shows sequence identities of 97 and 93% with the type III Na^+-P_i cotransporters mouse PiT-1 and human PiT-1, respectively. Expression of rat PiT-1 in *Xenopus* oocytes revealed that it possesses Na^+-dependent P_i cotransport activity. PiT-1 mRNA is widely distributed in rat tissues and is most abundant in brain, bone, and small intestine. The amount of PiT-1 mRNA in the parathyroid of vitamin D-deficent rats was reduced compared with that in normal animals, and increased markedly after administration of 1,25-dihydroxyvitamin D_3. Furthermore, the abundance of PiT-1 mRNA in the parathyroid was much greater in rats fed a low-P_i diet than in those fed a high-P_i diet. Thus, rat PiT-1 may contribute to the effects of P_i and vitamin D on parathyroid function.