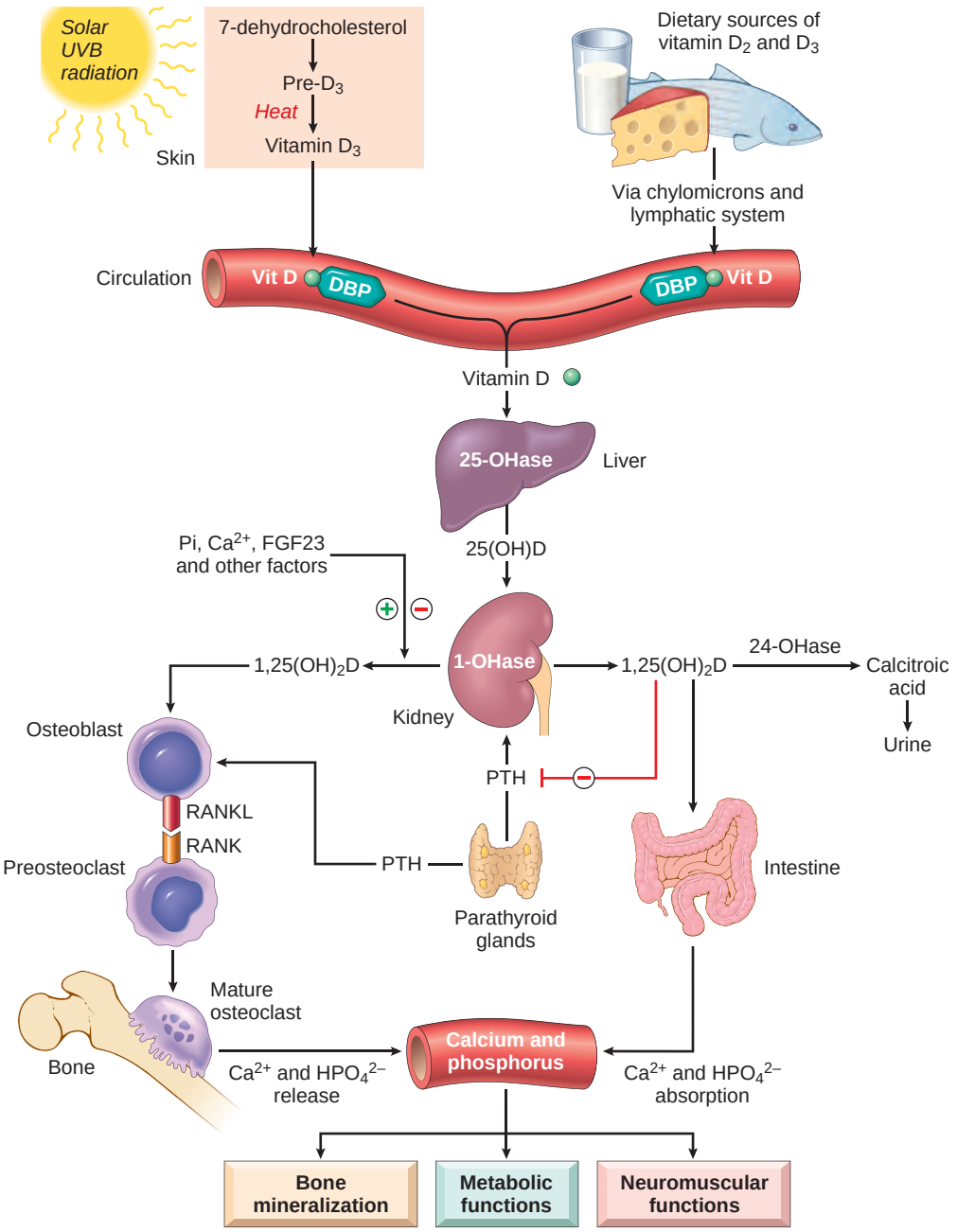

Figure 9-26 Vitamin D metabolism. Vitamin D is produced from 7-dehydrocholesterol in the skin or is ingested in the diet. It is converted in the liver into 25(OH)D, and in kidney into 1,25$(OH)_2$D (1,25-dihydroxyvitamin D), the active form of the vitamin. 1,25$(OH)_2$D stimulates the expression of RANKL, an important regulator of osteoclast maturation and function, on osteoblasts, and enhances the intestinal absorption of calcium and phosphorus in the intestine. DBP, Vitamin D–binding protein (α_1-globulin); FGF23, fibroblast growth factor 23.

the already mentioned RXR. This heterodimeric complex binds to vitamin D response elements located in the regulatory sequences of vitamin D target genes. The receptors for 1,25-dihydroxyvitamin D are present in most cells of the body. In the small intestine, bones, and kidneys, signals transduced via these receptors regulate plasma levels of calcium and phosphorus. Beyond its role on skeletal homeostasis, vitamin D has immunomodulatory and antiproliferative effects. 1,25-dihydroxyvitamin D also appears to act through mechanisms that do not require the transcription of target genes. These alternative mechanisms involve the binding of 1,25-dihydroxyvitamin D to a membrane-associated vitamin D receptor (mVDR), leading to the activation of protein kinase C and opening of calcium channels.

Effects of Vitamin D on Calcium and Phosphorus Homeostasis. The main functions of 1,25-dihydroxyvitamin D on calcium and phosphorus homeostasis are the following:

- *Stimulation of intestinal calcium absorption.* 1,25-dihydroxyvitamin D stimulates intestinal absorption of calcium in the duodenum through the interaction of 1,25-dihydroxyvitamin D with nuclear vitamin D