Bronner / Farach-Carson / Roach

Bone and Development

This book, Vol. 6 in the series Topics in Bone Biology, deals with bone develop ment from growth to mineralization. Understanding tissue dev- opment involves combining embryological and histological information with the increasing knowledge from molecular and genetic studies. In each developmental stage, some genes are expressed and others silenced. Disease, especially disease progression, also is characterized by changes in gene expression that then are transmitted to daughter cells. In both situations, the choreography of gene expression and partial or complete silencing often are the result of the interaction between the genome and the epi- nome, i.e., between a very stable set of structures and rapidly changing environmental factors. Chapter 1, by O'Connor, Farach-Carson, and Schanen, is an overview of the feld and of topics discussed in greater detail in subsequent chapters. After discussing bone development in terms of intramembranous and en- chondral ossifcation, the chapter describes gene expression in osteoblasts and osteoclasts, bone cell coupling, and the regulatory effects of steroid h- mones. Primary genetic defects that lead to various bone diseases – Marfan's syndrome, Paget's disease, and juvenile osteoporosis, among others – are analyzed. The chapter ends with a section on the epigenetic regulation of bone development, including methylation, histone modifcations, and imprinting. This chapter, like all others, has an extensive bibliography and fgures to illustrate principal points.

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