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Sommario/riassunto	“Cells live together, but die singly”, this sentence wrote the German physiologist Theodor Engelmann in 1875 and although he had no particular knowledge of gap junction channels (their structure was discovered around 100 years later) he described their functions very well: gap junction channels are essential for intercellular communication and crucial for the development of tissue and organs. But besides providing an opportunity for cells to communicate gap junction channels might also prevent intercellular communication by channel closure thereby preserving the surrounding healthy tissue in case of cellular necrosis. According to today’s understanding gap junction channels play an important role during embryonic development, during growth, wound healing and cell differentiation and are also involved in the process of learning. In the past decades most intensive research was done not only to unravel the physiological role of gap junction channels but also to extend our knowledge of the contribution of these channels in pathogenesis. A new frontier emerges in the field “pharmacology of gap junctions” with the aim to control growth, differentiation, or electrical coupling via targeting gap junction

channels pharmacologically.As we know today disturbances in gap junction synthesis, assembly and cellular distribution may account for various organic disorders from most different medical fields, such as the Charcot-Marie-Tooth neuropathy, epilepsy, Chagas-disease, Naxos-syndrome, congenital cardiac malformations, arrhythmias, cancer and as a very common disease in industrial countries atherosclerosis. Point mutations in gap junction channels have been found to cause hereditary diseases like the congenital deafness or the Charcot-Marie-Tooth neuropathy but the exact molecular mechanisms of gap junction malfunction from most of the mentioned illnesses are not fully understood. Moreover, in the last few years research has expanded on the role and function of connexin hemichannels and on a relatively new field the pannexins. The purpose of this volume is to give a comprehensive overview of the involvement of gap junction channels, hemichannels and pannexins on pathogenesis of inborn and acquired diseases and on emerging pharmacological strategies to target these channels.We welcome our colleagues to contribute their findings on the influence of gap junctions on pathogenesis and to unravel the secrets of intercellular communication. Take the lid off!