Abstract:
cGMP signalling plays an important physiological role in diverse organs including the vasculature, the GI-tract and the nervous system. Furthermore, cGMP-elevating substances such as glyceryl trinitrate are important drugs used in cardiovascular diseases. Physiologically, cGMP synthesis is induced by nitric oxide (NO) and natriuretic peptides through the stimulation of guanylyl cyclases. Major mediators of cGMP signalling are the cGMP-dependent protein kinases type I and II (cGKI and cGKII). The functional significance of each kinase type in diverse organs was determined using total and tissue-specific cGKI- and cGKII-deficient mice. These studies established that cGKI plays a major role in the regulation of the cardiovascular and the gastrointestinal system, hippocampal and cerebellar learning and pain perception. cGKII is involved in intestinal water secretion, bone growth and circadian rhythmicity. The cGK mutant mice are important tools to obtain detailed insights into cGMP-mediated signalling pathways in health and disease.