Abstract
The adrenal gland is among the organs with the highest concentration of vitamin C in the body. Interestingly, both the adrenal cortex and the medulla accumulate such high levels of ascorbate. Ascorbic acid is a cofactor required both in catecholamine biosynthesis and in adrenal steroidogenesis. Here we provide an overview on the role of vitamin C in the adrenal cortex and medulla derived from in vitro and in vivo studies. In addition, recent insights gained from an animal model with a deletion in the gene for the ascorbic acid transporter will be summarized. Mutant mice lacking the plasma membrane ascorbic acid transporter (SVCT2) have severely reduced tissue levels of ascorbic acid and die soon after birth. There is a significant decrease of tissue catecholamine levels in the adrenals. On the ultrastructural level, adrenal chromaffin cells in SVCT2 null mice show depletion of catecholamine storage vesicles, signs of apoptosis, and increased glycogen storage. Decreased plasma levels of corticosterone and altered morphology of mitochondrial membranes indicate additional effects of the deficiency on adrenal cortical function. The data derived from these animal models and various cell culture studies confirm a crucial role for vitamin C for both the adrenal cortex as well as the adrenal medulla further underlining the interdependence of the two endocrine systems united in one gland.