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**Review**

# Statins: a new insight into their mechanisms of action and consequent pleiotropic effects

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**Abstract:**

In the recent years, 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitors have emerged as the most important class of lipid-lowering agents. Through inhibition of HMG-CoA reductase, they restrict the rate-limiting step of cholesterol synthesis resulting in up-regulation of low density lipoproteins (LDL) receptors on the cell membrane and reduction of atherogenic LDL consequences. The wide spectrum of non-lipid-mediated pleiotropic effects of statins includes: improvement of endothelial dysfunction, increased nitric oxide bioavailability, antioxidant effects, anti-inflammatory and immunomodulatory properties, stabilization of atherosclerotic plaques and inhibition of cardiac hypertrophy. Several clinical trials have demonstrated and confirmed these beneficial effects of statins in cardiovascular disorders, in primary and secondary prevention settings. Recent studies have reported that the physiological background of the widespread therapeutic efficacy of HMG-CoA reductase inhibitors involved various mechanisms, partially associated with statin impact on posttranslational modifications (e.g. prenylation process). In this review, we have focused on some of them, especially including the statin impact on the endothelial dysfunction and inflammation, peroxisome proliferator-activated receptor (PPAR), beta-adrenergic signaling, renin-angiotensin system and their possible mutual mechanistic linkage.

**Key words:**

HMG-CoA reductase inhibitors, pleiotropic effects, peroxisome proliferator-activated receptor, beta-adrenergic signaling, renin-angiotensin system, mechanism

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