(S)-Equol is a metabolite produced in humans and animals after consuming daidzein, a soy isoflavone. While equol exists in two enantiomeric forms S-equol and R-equol, it is the former that binds preferentially to the estrogen receptor beta. Equol exhibits anti-aging, antioxidative, estrogenic, anti-inflammatory, and chemopreventive activities. In vitro, equol increases expression of extracellular matrix proteins collagen and elastin as well as nerve growth factor (NGF) and decreases expression of aging genes and pro-inflammatory cytokines such as matrix metalloproteinases 1, 3, and 9 (MMP1/3/9), COX-1, IL-6, and IL-1α. In fibroblasts, equol inhibited ROS generation and oxidative stress. In animal models, equol increases activity of catalase, superoxide dismutase (SOD), glutathione peroxidase, and glutathione reductase. Additionally, equol inhibits TNF-α production, NF-κB activation, and iκB kinase degradation in macrophages. This compound increases activation of p53, caspase 3, and poly(ADP)-ribose polymerase (PARP), increases expression of p21 and Bax, and decreases expression of Bcl-2, resulting in apoptosis and inhibition of tumor formation in animal models.

References


