

# THE SCIENCE SUPPORTING SOY ISOFLAVONES

## ABSTRACT

Research suggests that estrogen deficiencies following menopause may contribute to signs of aging in skin. Systemic and topical estrogens have been shown to counter these effects and to have antioxidant properties. Although much weaker, soy isoflavones (phytoestrogens) have been shown to mimic estrogen and to have antioxidant effects, making them ideal for use on maturing skin.

## AGING SKIN AND HORMONAL FLUCTUATIONS

As humans age, the skin becomes dry, loses its elasticity, and begins to wrinkle — these are the primary visible effects of chronological aging. Following menopause<sup>1-3</sup> it has been shown that skin thickness decreases and collagen levels in the skin diminish, which may further contribute to these negative age-related changes in the skin. Scientific studies strongly suggest that these changes may be attributed to menopausal and/or age-related hormonal fluctuations. More specifically, research suggests that estrogen deficiency may primarily be responsible.

## ESTROGEN: A CRUCIAL PART OF THE AGING EQUATION

Estrogen works by joining with estrogen receptors in the body and signaling genes in cells to be switched on or off. Flipping these switches can cause the body to generate new cells or to produce special substances. For example, raised estrogen levels can cause breast growth during pregnancy, as well as the production of milk following pregnancy. Following menopause, the body stops producing much estrogen. Although the exact mechanisms are unknown, this reduction in estrogen is believed to contribute to decreases in skin thickness, dryness, and loss of elasticity.

Estrogen receptors have been detected in the skin, and systemic<sup>2,4</sup> and topical<sup>5,6</sup> estrogen have now been shown to increase skin thickness, increase collagen levels, and improve wrinkling and dryness.<sup>7,8</sup> While estrogen is important, researchers also believe that decreased estrogen levels are only part of the aging equation; free radical attack caused by exposure to environmental elements like sunlight, smoke, and pollution also contributes to premature aging in skin. Antioxidants can help counter these effects by neutralizing free radicals, and estrogens are strong antioxidants with even stronger activity than vitamin E and vitamin C.<sup>9-11</sup>

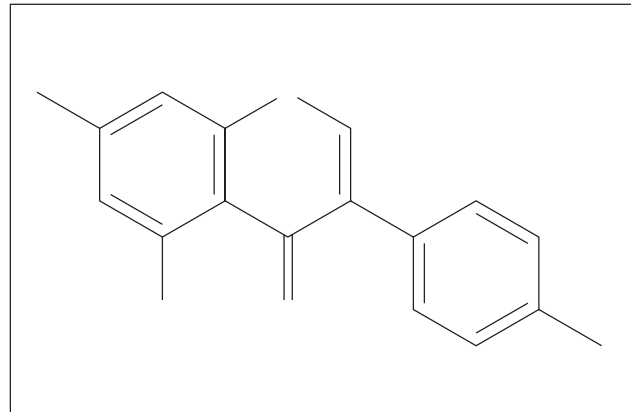
## SOY ISOFLAVONES: AN ALTERNATIVE TO ESTROGEN

Soy isoflavones are phytoestrogens, substances that mimic the activity of estrogen. The estrogenic effect of phytoestrogens is considerably weaker than estrogens, but is appreciable<sup>12</sup> and both oral and topical application of phytoestrogens have been shown to have many beneficial effects for the skin. In addition to estrogenic activity, soy isoflavones have antioxidant properties,<sup>13,14</sup> and like other antioxidants, help to prevent free-radical damage to DNA.

Soy-containing foods may contain as much as 1/1000 of their content as phytoestrogens and are credited with the low incidence of cardiovascular disease<sup>15-17</sup> and breast cancer<sup>18</sup> in Asian populations that consume large amounts of these substances.<sup>19,20</sup> Phytoestrogens have also been effective for preventing skin cancer in mice, both orally<sup>21</sup> and topically.<sup>22</sup>

## GENISTEIN: BENEFITING SKIN

**Figure 1. Chemical Structure of Genistein**



Two key isoflavones found in soy are genistein and diadzein. Genistein is the most abundant isoflavone in soy, and there is a strong body of research supporting the benefits genistein provides the skin. Genistein is a strong antioxidant<sup>23,24</sup> and may be effective in preventing cancer. Although its exact anti-cancer mechanism is unknown, genistein has been proven to protect against sunburn in humans<sup>25</sup> and to block the formation of reactive oxygen species. The antioxidant effect of phytoestrogens is also synergistically enhanced in the presence of vitamin C.<sup>26</sup> This makes soy isoflavones an ideal alternative to estrogen therapies, and perfect for use on maturing skin.

## SUMMARY

Soy isoflavones or phytoestrogens mimic estrogen behavior and may have beneficial effects in maturing skin. Estrogen deficiencies in post-menopausal women may contribute to decrease of skin thickness, dryness, and loss of elasticity and it is believed that topical application of soy isoflavones may help counter some of these negative age-related changes.

*For more information, or for a complete bibliography of scientific research supporting SkinCeuticals products, please visit the SkinCeuticals, Inc. website at [www.skinceuticals.com](http://www.skinceuticals.com), or call toll free 800-811-1660.*

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