**REPORT**

**Activate Your Longevity Genes: Five Natural Compounds Simulate Caloric Restriction**

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**CANCER PREVENTION**

Calorie restriction (CR) upregulates genes that suppress cancer and downregulates genes that permit cancers to form or spread. CR prevents cancer cell reproduction and proliferation, while inhibiting the blood vessel growth cancer cells require to develop and metastasize.46,56-62

**Resveratrol** and **pterostilbene** mirror these effects. They combat cancer at every stage of development, inducing apoptosis (programmed cell death) in a variety of human cancer types, while preserving healthy cells.32,63-66 Resveratrol also suppresses cancer proliferation by modulating expression of proteins involved in the reproductive cycle of abnormal cells.67,68

**Quercetin** activates “executioner” proteins while inhibiting survival proteins in human cancer cells, blocking their reproduction.69-71 Quercetin and resveratrol have also been shown to block the expression of vascular endothelial growth factor (VEGF), an effect that may help starve tumors of their blood supply.72

**Grape seed extract** induces expression of a protein that arrests cancer cells early in their reproductive cycle, preventing further development and destroying them.73 Similar to quercetin, grape seed extract fights angiogenesis by suppressing the VEGF signaling pathway.74

**Black tea extract** reduces expression of genes that cancer cells use to proliferate, survive, infiltrate healthy tissue, supply themselves with blood, and metastasize to other organs.75 It has also been shown to upregulate expression of proteins that arrest the cell reproductive cycle and induce cellular death specifically in cancers.76

**ENHANCED GLUCOSE CONTROL**

**Caloric restriction** enhances glucose control.77,78 Recall that not one of the Rhesus monkeys in the study discussed earlier developed diabetes or exhibited symptoms of impaired glucose control.9 Caloric restriction triggers gene regulators called **peroxisome proliferator-activated receptors** (PPARs), a class of proteins responsible for healthy fat and carbohydrate metabolism. They also play key roles in optimizing mitochondrial health57,59 and thwarting the onset of metabolic syndrome and diabetes.79

**Resveratrol**80 and **pterostilbene**81,82 upregulate the production and activity of PPAR, launching a set of cellular processes that support a youthful metabolic profile. The PPAR activator resveratrol has been shown to:

- Prevent fat cells from absorbing sugar and converting it to fat83
- Reduce inflammation and insulin resistance in fat cells84
- Boost mitochondrial function 85

**Grape seed extract** modulates a **different** set of PPARs that regulate fat storage. Grape seed extract induces fat metabolism while inhibiting the development of new fat cells.86,87 It also protects endothelial cells by preventing the inflammatory response to proteins damaged by glucose (the age-accelerating process known as **glycation**).88

**Resveratrol** further exerts a favorable influence on blood sugar metabolism at the cellular level, reducing glucose production in liver cells in a way that mimics prolonged calorie restriction.89 In diabetic animals, resveratrol has been shown to help restore blood sugar to normal by modulating the activity of several enzymes involved in sugar metabolism.90

**Pterostilbene** and **grape seed extract** generate similar beneficial changes that help promote healthy blood sugar levels.91,92 Grape seed extract activates genes that trigger glucose uptake. This assists cells in the absorption and removal of glucose from circulation.92
Quercetin has been shown to stimulate the proliferation of pancreatic cells that help modulate blood glucose levels in both diabetic and non-diabetic animal models. It also markedly reduces expression of the enzyme that produces sorbitol, a sugar alcohol known to cause cataracts and blindness.

Black tea extract polyphenols inhibit lipase, an enzyme that breaks down fat in the stomach and small intestines. This helps block absorption of fat into the bloodstream.

In animal models, the theaflavins in black tea extract prevent after-meal elevations in blood glucose and may protect against the metabolic syndrome. This effect may help increase signaling for a powerful longevity factor called FOXO1a.

SUMMARY

Caloric restriction (CR) is the most scientifically validated method shown to reliably extend life span in multiple species, from microorganisms to mammals.

A milestone 20-year study provides the most conclusive evidence to date of its efficacy in Rhesus monkeys, our close genetic relatives. The discovery of calorie restriction-mimicking nutrients makes it possible for aging humans to emulate some of CR’s beneficial mechanisms of action, especially as an adjunct to modestly reducing one’s overall calorie intake. The unique ability of these nutrients to modulate gene expression exerts system-wide effects that, in addition to influencing many of the same pathways activated by calorie restriction, can also significantly reduce degenerative disease risk.

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

References


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