PRO Summary: TNF-alpha

TNF-alpha (tumor necrosis factor alpha) is an inflammatory cytokine produced by certain immune system cells during acute inflammation. The main role of this cytokine involves signaling for 'apoptosis' meaning the cell needs to be destroyed. This is important both in fighting off a pathogen as well as in killing cancer cells.[ref] However, if the system becomes unbalanced, it can produce a constant inflammatory response.

Chronic inflammation

Elevated levels of TNF-alpha are linked to almost all chronic diseases. Genetic variants in the TNF gene can be a positive when fighting off certain bacteria or viruses, but they can also cause a propensity toward chronic inflammatory diseases. Several common genetic variants increase TNF-alpha levels and increase the risk of inflammatory conditions.

Higher TNF-alpha is linked to:

- rheumatoid arthritis
- psoriasis
- IBD (ulcerative colitis, Crohn's disease)
- skin infections
- gum disease
- asthma
- diabetic ulcers
- heart disease
- septic shock
- depression
- COPD
- neurodegenerative diseases

Research relating TNF-alpha to chronic diseases:

Depression: A 2008 genome-wide association study found that a TNF genetic variant increases the risk of depression.[ref]

Heart Disease: Studies show variants that increase TNF are causally linked to an increased risk of heart disease.[ref]

Uterine Fibroids: The growth of the fibroids is thought to be caused by steroid hormones (estrogen, progesterone), growth factors, cytokines, and chemokines. Research points to TNF-alpha as the most important cytokines involved in fibroid growth.[ref]

Alzheimer's and Parkinson's: Amyloid-beta can activate microglia and astrocytes, further perpetuating the creation of TNF-alpha and other inflammatory cytokines.[ref][ref]

Non-alcoholic fatty liver disease (NAFLD): Research using animals that were genetically altered to reduce TNF-alpha levels shows that TNF-alpha is a driving factor in fatty liver disease.[ref][ref]

Genetic Connections

There are several genetic variants linked to naturally more active TNF-alpha. If you carry genetic variants related to higher TNF-alpha levels and have a related inflammatory condition, inhibiting TNF-alpha may help to reduce chronic inflammation.

Lifehacks for reducing high TNF-alpha:

TNF-alpha inhibitors can lower blood pressure and may interact with other medications.

Lifestyle changes:

- **Vitamin D** may help people with MS and the TNFRSF1A variant. A study found that there was a statistically significant interaction with variant carriers being at high risk for relapse with low vitamin D levels.[ref]
- **Exercise** exerts part of its anti-inflammatory effects via reducing TNF-alpha.[ref]
- **Cigarette smoking** is linked to significantly higher TNF-alpha levels, and this association may be a driving factor in COPD and other chronic inflammatory diseases linked to smoking. [ref][ref]
- High **folate** vegetable intake decreased TNF-alpha levels in women with the MTHFR C677T TT genotype.[ref]

8 natural TNF-alpha inhibitors:

- **Curcumin** found in turmeric, is a natural TNF-alpha inhibitor.[ref]
- **Rosmarinic acid** (found in rosemary, basil, holy basil, lemon balm, and perilla oil) is a natural TNF-alpha inhibitor.[ref] In addition to adding herbs to your food, holy basil can be found in a tea (called Tulsi tea) or as a supplement.
- **Resveratrol** is another natural flavonoid that has been shown in studies to decrease TNF. It is thought to work via increasing SIRT1.[ref][ref]
- **Probiotics** containing Bifidobacteria or Lactobacillus may decrease TNF-alpha levels.[ref] Lactobacillus Plantarum restores tight junctions (decrease leaky gut) in the intestines. It also decreased TNF-alpha.[ref][ref]
- **Glycine** has been shown to reduce TNF-alpha and inflammation.[ref] Glycine is an amino acid that is abundant in bone broth, collagen, and gelatin.
- **Magnesium:** Low magnesium levels may play a role in higher TNF-alpha levels. Magnesium sulfate, in conjunction with thyroid medication, in hypothyroid rats, decreased TNF-alpha levels.[ref][ref]
- **Luteolin:** In a study of children with autism spectrum disorder, luteolin supplementation has been shown to decrease elevated TNF levels significantly. The supplement used in the study was NeuroProtek.[ref]
- **Hesperidin,** a natural flavonoid from citrus fruits, inhibits the release of TNF-alpha.[ref]
- **Aged garlic extract** has been shown in a study to decrease TNF-alpha levels by 35%.[ref] [ref]

https://www.geneticlifehacks.com/tnf-alpha-variants/