Evaluating patients' individual response regarding anti-inflammatory preparations using the TNF-α inhibitor test

TNF-α as a pro-inflammatory key cytokine

Tumour necrosis factor alpha (short: TNF-α) is a cytokine, which is involved in almost all inflammatory reactions. TNF-α is the first cytokine to be expressed in activated macrophages' signalling cascade. Its most important function is the activation of various immune cells. TNF-α has the ability to promote cell differentiation and the expression of other cytokines. Within the CNS, it causes fever, fatigue, gene-ral feeling of illness and affects the lipid meta-bolism, blood coagulation, insulin resistance, and the convalescence of patients with arteriosclerosis.

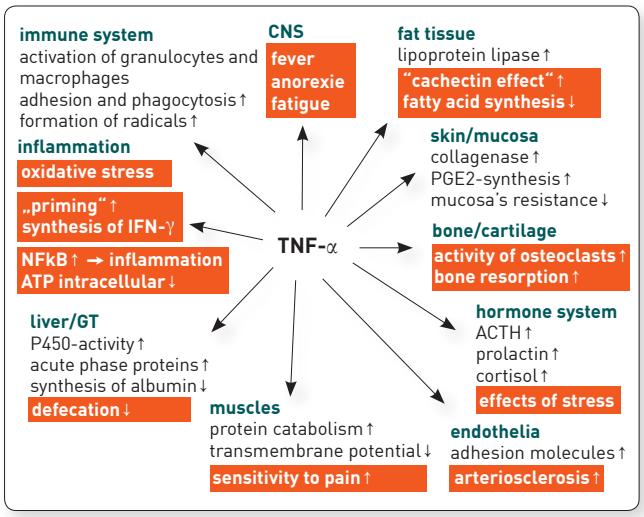

Fig.1 local and systemic effects of TNF-α

In rheumatology, TNF-α blockers are administered as long-term anti-rheumatic drugs. Remicade®, Humira® and Enbrel® are antibody preparations that block TNF-α's effect at its receptors on target cells. The preparations above do not inhibit the expression of TNF-α by macrophages. For this therapy approach only the typical anti-inflammatory preparations (e.g. prednisolone) as well as numerous phytopharmaceuticals and some dietary supplements with described anti-inflammatory properties are available so far.

However, regarding their clinical activity, patients show varying responses, which is due to highly differing and individual numbers of toll-like receptors on macrophages.

Therefore, running the TNF-α inhibitor test as a pretest is sensible, if the most effective preparation for an adjuvant anti-inflammatory therapy in an individual case needs to be pre-selected.

Principle of the test

The standardised expression of LPS-induced TNF-α (TNF-α base value) is used as a reference value. In replicate controls, the LPS-induced TNF-α secretion is analysed under the influence of added preparations.

Note: LPS (lipopolysaccharide) is a surface molecule of gram-negative bacteria, which induces a significant inflammatory response (TNF-α secretion) in monocytes/macrophages by binding to their CD14 molecules.

Is the test sensible only in cases with increased TNF-α levels in blood?

No, TNF-α is used only as a marker cytokine for the activation of macrophages. By detecting the release of TNF-α, the test assesses whether the respective preparation has an impact on the inflammatory cascade. Regarding the detection of LPS-induced inflammatory responses, TNF-α has proven a more sensitive and better test than IL-1 or IL-6. Therefore, the TNF inhibitor test is beneficial in context with any type of myelomonocytic inflammation, even if it has been proven only via increased CRP, IL-1, or IL-6. The TNF-α inhibitor test is a global inflammation inhibitor test.

Material

10 ml heparin blood
Sample receipt within 24 hrs has to be ensured. The sample should be stored and transported at room temperature. Within the Berlin city area, we offer a courier service (+49 (0)30 7701- 250). For collections beyond Berlin, please contact our complimentary courier service (+49 (0)30 77001-450).

Costs

Costs for the test are a one-time payment of 17.31 € for the basic TNF-α response and 18.47 € per each desired preparation.

IMD Labor Berlin — **medical report**

Test	Result	Unit
TNF-alpha inhibitor test		
The TNF-a base value is the reference value that is used to compare corresponding TNF-α levels of each preparation to. Values below the base value indicate an anti-inflammatory effect. Values above the base value indicate a pro-inflammatory in vitro effect of the respective preparation.		
TNF-α base value (LPS-stimulated)	1760	pg/ml
TNF-α preparation 1 (1) prednisolone	212	pg/ml
TNF-α preparation 2 (2) Boswellia	354	pg/ml
TNF-α preparation 3 (3) milk thistle	1782	pg/ml
TNF-α preparation 4 (4) curcumin	2544	pg/ml

Next to prednisolone, especially Boswellia has a proven TNF-inhibiting and thus anti-inflammatory effect. Milk thistle does not show any effect, while curcumin even has an activating effect.)

Fig. 2 sample medical report

Do you have questions? Our serviceteam will be happy to support you: +49 (0)30 770 01-220.

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The following preparations are established for the TNF-alpha inhibitor test and are available in the laboratory (alphabetic order):

Preparation (producer)	Medical compound
Alpha Liponsäure Mono (Capsumed)	Alpha lipoic acid
Angocin Anti-Infekt N (Repha)	Nasturtium/horseradish
Artemisia Annua pur (Capsumed)	Annual wormwood
Arthroflexan plus (Natures Own)	Glucosamine sulphate/Chondroitin sulphate
Banderol (TS Products)	Bark extract
Bicorsan (Jabosan Health Care)	Boswellia, curcumin, linseed oil
Boscari (Olibanum)	African incense
Boswellion Plus (Natures Own)	Weihrauch, Teufelskralle
Bromelain (Vita World)	Cysteine protease
Catechin-Loges (Dr. Loges)	Green tea extract + vitamin C
CBD – Cannabis Öl (HEALTH+)	Cannabidiol
Cilantris (Nestmann Pharma)	Coriander
Cistus Incanus (Hannes Pharma)	Cistus
Coenzym Q 10 (Zein Pharma)	Ubiquinone
Colestyramin (Hexal)	Cholesterol inhibitor
Colostrum (Allcura)	First milk preparation
Cordyceps Extrakt (Capsumed)	Vitality mushroom
Cranberry (11 A Nutritheke)	American Cranberry
Curcumin-loges® (Dr. Loges)	Curcumin/ vitamin D
Derris Scandens (Siam Heilkräuter)	Flavonoids, isoflavones
Eicosapen (Truw Arzneimittel)	Omega 3 fish oil
Eleu Kokk (Boehringer)	Siberian ginseng (Eleutherococcus senticosus)
Enzym pur (Capsumed)	Bromelain/Papain/Rutin
Felis (Hexal)	St. John's Wort
Hagebutten Extrakt (Trendbalance)	Rosehip
Hericium-erinaceus (Mycovital Heilpilze)	Lion's mane mushroom
Hox Alpha (Strathmann)	Stinging nettle
Inflam effekt (Life Light)	Micronutrients
Karazym (Volopharm)	Enzyme preparation
Kelt Vital (Trendvital)	Uridin monophosphat, vitamin B12, 5-Methyltetrahydrofol acid
Koreanischer roter Ginseng (KGV-Korea-Ginseng Vertrieb)	Ginsenosides
Krillöl (Capsumed)	Krill oil
L-Carnitin (Diamant Natur)	Amino acid
L-Curcumin (Trendbalance)	Curcugreen
L-Curcumin (TrendVital med)	Curcuma longa extract
Leinöl (Berco Arzneimittel)	Linseed oil
Lidocain (Braun)	Neuraltherapeuticum

Preparation (producer)	Medical compound
MSM (Essential Food)	Methyl-sulfonyl-methane
Omega 3 Max (Capsumed)	Omega 3 fish oil
Peony Immune (life Extensions)	White peony roots
Phyto Curcuma (Capsumed)	Curcuma/turmeric
Phyto Isoflavonoid (Capsumed)	Soy isoflavones and red clover
Phyto Weihrauch 400 (Capsumed)	Indian incense
Prednisolon (Mibe)	Glucocorticoid
Pro Agalostrum (Tisso)	Colostrum, vitamin D3, Agaricus
Procain (Dr. Loges)	Neuraltherapeuticum
Pro Carnitin (Tisso)	L-Carnitine
Pro Curmin Complete II (Tisso)	Curcuma
Pro Dialvit (Tisso)	Combined preparation
Pro Immupec (Tisso)	Natural fermentation product with vitamin D3
Pro Mucosa (Tisso)	L-Glutamine, quercetin, lecithin, broccoli, MSM
Pro Sirtusan (Tisso)	Bioactive polyphenols
ProEmsan (Tisso)	Probiotic micro-organism
Propolis (Langer Vital)	Bee propolis
Quercetin (Bios Medical)	Onion extract
reduziertes Glutathion (Apozen)	GSH
Reishi (Capsumed)	Medicinal fungus
Resveratrol (Zein Pharma)	Polyphenol phytoalexin
Rizol-Omega Borax-Lösung nach Dr. Steidl (Fürstenplatz Apotheke)	Rizol-Omega, Borax, Chloroquin
SAMe 200 pur (Capsumed)	S-Adenosylmethionine
Silymarin (AL)	Milk thistle
Super-S-Plus (Dr. Hittich)	MSM-incense-ginger
Synerga (Laves Arzneimittel)	E.coli
Tigovit (EGCG)	Green tea extract
TNF balance (Trendvital)	Boswellia carterii, curcumin
TNF direkt (Viathen)	Incense resin
Weihrauch 250 (Natures Own)	Incense
Weihrauch serrata (Trendbalance)	Incense, willow bark, ginger

Essential oils	Medical compound
Lavender oil (various pharmacies)	Lavender
Lemon oil (various pharmacies)	Lemon
Lemongrass oil (various pharmacies)	Lemongrass
Thyme oil (various pharmacies)	Thyme
Rosemary oil (various pharmacies)	Rosemary
Manuka oil (various pharmacies)	Manuka

In case you would like to test a preparation that is not listed above, we would kindly ask you to add it to your sample when sending it to us. Upon request, the preparation can be stored up to 3 months in the laboratory to assure substance stability for further tests (please indicate on the transfer form).

Regarding "TNF-alpha blockers" such as Enbrel® (Etanercept), Remicade® (Infliximab) or Humira® (Adalimumab), the TNF inhibitor test is not useful, since the effect of these substances is not based on a reduced release of TNF-α from monocytes/macrophages. Those three substances block TNF-α effect in the blood or at the target cell.