

# Immunosuppressant Ingredients, Immunostimulant Ingredients

## Immunosuppressant Ingredients

**Immunosuppressant ingredients are chemical and medicinal agents used for the suppression and regulation of immune responses. Pharmacologically speaking, these agents have varied mechanisms of action, such as regulation of inflammatory gene expression, suppression of lymphocyte signal transduction, neutralization of cytokine activity, and inhibition lymphocyte proliferation by agent-induced cytotoxicity. Common agents include glucocorticoids, alkylating agents, metabolic antagonists, calcineurin inhibitors, T-cell suppressive agents, and cytokine inhibitors.**

- 5-Aminosalicylic Acid** 25g / 500g [A0317]  
5-Aminosalicylic acid (5-ASA) is commonly used as a gastrointestinal anti-inflammatory agent. It has in vitro and in vivo pharmacologic effects that decrease leukotriene production, scavenge for free radicals, and inhibits leukocyte chemotaxis *et al.*
- Azathioprine** 5g / 25g [A2069]  
Azathioprine is a prodrug of 6-mercaptopurine (6-MP), which inhibits the synthesis of purine ribonucleotides and DNA/RNA.
- Cyclophosphamide Monohydrate** 5g / 25g [C2236]  
Cyclophosphamide is an antitumor alkylating reagent involved in the cross-linking of tumor cell DNA.
- Cyclosporin A** 100mg / 1g [C2408]  
Cyclosporin A is a cyclic polypeptide immunosuppressant. It inhibits the activity of T-lymphocytes, and the phosphatase activity of calcineurin.
- Dimethyl Fumarate** 25g / 500g [F0069]  
Dimethyl fumarate has neuroprotective and immunomodulating effects.
- Fingolimod Hydrochloride** 200mg / 1g [F1018]  
Fingolimod (FTY720) is an immunomodulatory agent. It is an agonist at sphingosine 1-phosphate (S1P) receptors, and inhibits lymphocyte emigration from lymphoid organs.
- Iguratimod** 25mg / 250mg [I0945]  
Iguratimod (T-614) is an agent with anti-inflammatory and immunomodulatory activities. Its activity functions by the inhibiting production of immune globulin and inflammatory cytokines such as TNF- $\alpha$ , IL-1 $\beta$  and IL-6, and used as a disease modifying anti-rheumatic drug (DMARD).
- Leflunomide** 200mg / 1g [L0250]  
Leflunomide is an immunomodulatory agent bearing two mechanisms of action: inhibition of pyrimidine nucleotide synthesis and interference with tyrosine phosphorylation. As a result, it reduces the proliferation of T and B immune cells that are active in MS (multiple sclerosis). Its active metabolite is teriflunomide [T3287].
- Lobenzarit Disodium Salt** 25mg / 100mg [L0278]  
Lobenzarit is an immunomodulatory agent and used as a disease modifying anti-rheumatic drug (DMARD). Its principle mechanism action seems to be through a subset of T cells.
- 6-Mercaptopurine Monohydrate** 1g / 5g [M0063]  
6-Mercaptopurine (6-MP) is a prodrug which is converted *in vivo* to 6-thioinosine monophosphate (TIMP) which inhibits purine ribonucleotides and DNA/RNA synthesis.
- Methotrexate Hydrate** 1g / 5g [M1664]  
Methotrexate (MTX), an analog of folic acid, is a dihydrofolate reductase (DHFR) inhibitor and a folic acid antagonist. It inhibits DNA synthesis, cell proliferation in S phases and tumor cell growth.
- 6- $\alpha$ -Methylprednisolone** 1g / 5g [M1665]  
6 $\alpha$ -Methylprednisolone is a glucocorticosteroid with potent anti-inflammatory activities and reduced effects on electrolyte balance.
- Mycophenolic Acid** 1g [M2216]  
Mycophenolic acid (MPA) is an active metabolite of mycophenolate mofetil (MMF), and a selective inhibitor of inosine monophosphate dehydrogenase (IMPDH) for the synthesis of guanosine nucleotides in T and B lymphocytes.
- Mycophenolate Mofetil** 100mg / 1g [M2387]  
Mycophenolate mofetil (MMF) is a prodrug of the active immunosuppressant mycophenolic acid (MPA).
- Mizoribine** 50mg / 250mg [M2399]  
Mizoribine is an imidazole nucleoside with immunosuppressive and antiviral activities.
- D-Penicillamine** 5g / 25g [P0147]  
D-Penicillamine is a hydrolytic degradation product of penicillin-type antibiotics. The pharmacologic effects are associated with formation of a penicillamine-cysteine disulfide bond and metal chelation. Additionally, it selectively suppresses T-cell activity. B-cells are unaffected.
- Prednisolone** 1g / 5g / 25g [P0637]  
Prednisolone is an adrenocortical steroid agent with predominantly glucocorticoid properties, and the active hepatic metabolite of prednisone.
- Prednisolone Acetate** 5g [P1283]  
Prednisolone acetate is an adrenocortical steroid agent, and the acetate of prednisone [P0637].

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## Prednisolone 21-Phosphate Disodium Salt

5g [D3918]

Prednisolone 21-phosphate is an adrenocortical steroid agent, and the phosphate of prednisolone [P0637].

## Rapamycin

25mg [R0097]

Rapamycin is an inhibitor of the mammalian target of rapamycin (mTOR), and inhibits activation of T cells and B cells by reducing the production of interleukin-2 (IL-2).

## Sulfasalazine

25g [S0580]

Sulfasalazine is split by intestinal bacteria to two main metabolites, sulfapyridine and 5-aminosalicylic acid (5-ASA), with 5-ASA showing anti-inflammatory effects. It is also a known potent inhibitor of NF- $\kappa$ B. Recent studies have reported that it works as a glutamate-cysteine transporter (xCT) inhibitor, and suppresses CD44v-dependent tumor growth

## Tacrolimus Monohydrate

10mg / 50mg [M2258]

Tacrolimus (FK506) is a macrolide immunosuppressant positioning of the inhibitory activities of T-lymphocyte signal transduction and calcineurin.

## 6-Thioguanine

1g / 5g [T0212]

6-Thioguanine is converted to the active nucleotide metabolite in cells, subsequently leading to inhibition of DNA/RNA synthesis.

## ( $\pm$ )-Thalidomide

1g / 5g [T2524]

Thalidomide is a teratogenic non-barbiturate. Despite its troubled history, in the 2000's it was later discovered to have anti-inflammatory, anti-angiogenic and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) inhibitory activity.

## Triptolide

10mg [T2899]

Triptolide is a diterpene triepoxide with potent immunomodulation, anti-inflammatory, and anti-tumor properties by inhibiting NF $\kappa$ B activation.

## Teriflunomide

100mg / 1g [T3287]

Teriflunomide is the active metabolite of leflunomide [L0250] which inhibits pyrimidine nucleotide synthesis and interferes with tyrosine phosphorylation. It reduces the proliferation of T and B immune cells.

## Immunostimulant Ingredients

Immunostimulant or immunopotentiating ingredients are agents that stimulate the immune system by inducing activation or increasing activity of any of its components. Some of them called immune adjuvants, depending on the type of the agent. Immunotherapy can trigger the immune system to fight illness, including cancer. Immunotherapy remains a very active area of cancer research.

## Imiquimod

100mg / 1g [I0747]

Imiquimod is a Toll-like receptor 7 (TLR7) agonist and a potent immune activator.

## Inosine Pranobex

100mg / 1g [I1037]

Inosine pranobex is a synthetic compound formed from the 4-acetamidobenzoate salt of 1-dimethylamino-2-propanol and inosine in a 3:1 molar ratio. It supports the immune system through modulation of T-cell proliferation and T-cell function, with additional antiviral activity.

## Linomide

10mg [L0270]

Linomide increases natural killer (NK) cell activity and macrophage cytotoxicity. Additionally, it inhibits angiogenesis and reduces the secretion of tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ).

## Pidotimod

5g / 25g [P2147]

Pidotimod is a synthetic dipeptide with immunomodulating effects.

## Resiquimod

25mg / 100mg [R0197]

Resiquimod is a tricyclic imidazoquinolone and an imiquimod analog. It acts as an immunomodulator and an anti-viral agent through activation immune cells via the Toll-like receptor 7 and 7/8 (TLR7 and 7/8) dependent signaling pathway. This signalling subsequently induces mRNA encoding cytokines including interferon- $\alpha$  (INF- $\alpha$ ) at the treatment site.

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