

# PREDNISYN

## TABLET 5MG

### COMPOSITION:

Each tablet contains Prednisolone 5mg

### DESCRIPTION:

A 6.5 mm diameter, round, flat, scored on one side, plain on the other side, white tablet.

### INDICATION:

Rheumatic fever, rheumatoid arthritis, allergic diseases, nephrotic syndrome, bronchial asthma and other corticosteroid-indicated conditions.

### PHARMACOLOGY:

#### *Mechanism of Action:*

Pharmacodynamic Group: Corticosteroids for systemic use, plain.

ATC Code: H02A

Naturally occurring glucocorticoids (hydrocortisone and cortisone), which also have salt-retaining properties, are used as replacement therapy in adrenocortical deficiency states. Their synthetic analogs are primarily used for their potent anti-inflammatory effects in disorders of many organ systems. Glucocorticoids cause profound and varied metabolic effects. In addition, they modify the body's immune responses to diverse stimuli.

#### *Pharmacokinetics:*

#### Absorption:

Prednisolone is rapidly and apparently almost completely absorbed after oral administration; it reaches peak plasma concentrations after 1-3 hours. There is however wide inter-subject variation suggesting impaired absorption in some individuals. Plasma half-life is about 3 hours in adults and somewhat less in children. Its initial absorption, but not its overall bioavailability, is affected by food. Prednisolone has a biological half-life lasting several hours, making it suitable for alternate-day administration regimens.

#### Distribution:

Prednisolone shows dose dependent pharmacokinetics, with an increase in dose leading to an increase in volume of distribution and plasma clearance. The degree of plasma protein binding

determines the distribution and clearance of free, pharmacologically active drug. Reduced doses are necessary in patients with hypoalbuminemia.

#### Biotransformation:

Prednisolone is metabolized primarily in the liver to a biologically inactive compound. Liver disease prolongs the half-life of prednisolone and, if the patient has hypoalbuminemia, also increases the proportion of unbound drug and may thereby increase adverse effects.

#### Elimination:

Prednisolone is excreted in the urine as free and conjugated metabolites, together with small amounts of unchanged prednisolone.

### DOSAGE AND ADMINISTRATION:

Should be taken with food (take immediately after meal).

#### *Usual adult and adolescent dose:*

Oral, 5 -60mg daily in divided doses. For acute exacerbations of multiple sclerosis – oral, 200mg per day for one week, followed by 80mg every other day for one month.

#### *Usual adult prescribing limits:*

Oral, up to 250 mg a day.

#### *Usual pediatric dose:*

Adrenocortical insufficiency – oral, 140mcg (0.14mg) per kg of body weight or 4mg per square meter of body surface a day in three divided doses. Other indications – oral, 500mcg (0.5mg) to 2mg per kg of body weight or 15 to 60mg per square meter of body surface a day in three or four divided doses.

### ROUTE OF ADMINISTRATION:

For oral administration only.

### CONTRAINDICATIONS:

Hypersensitivity to the active substance or to any of the excipients. Systemic infections unless specific anti-infective therapy is employed. Patients with ocular herpes simplex due to the possibility of perforation. One of the excipients of the tablet is lactose; hence patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption should not take this medicine.

### WARNING & PRECAUTIONS:

Patients/and or carers should be warned that potentially severe psychiatric adverse reactions may occur with systemic steroids (see section Side Effects). Symptoms typically emerge within a few days or weeks of starting the treatment. Risks may be higher with high doses/systemic exposure

(see section Interaction with Other Medicaments), although dose levels do not allow prediction of the onset, type, severity or duration of reactions. Most reactions recover after either dose reduction or withdrawal, although specific treatment may be necessary. Patients/carers should be encouraged to seek medical advice if worrying psychological symptoms develop, especially if depressed mood or suicidal ideation is suspected.

Patients/carers should also be alert to possible psychiatric disturbances that may occur either during or immediately after dose tapering/withdrawal of systemic steroids, although such reactions have been reported infrequently. Particular care is required when considering the use of systemic corticosteroids in patients with existing or previous history of severe affective disorders in themselves or in their first-degree relatives. These would include depressive or manic-depressive illness and previous steroid psychosis. Caution is necessary when corticosteroids, including prednisolone, are prescribed to patients with the following conditions and frequent patient monitoring is necessary:

- Diabetes mellitus or in those with a family history of diabetes.
- Glaucoma or in those with a family history of glaucoma.
- Hypertension or congestive heart failure.
- Liver failure.
- Epilepsy.
- Osteoporosis: This is of special importance in post-menopausal females who are at particular risk.
- Patients with a history of severe affective disorders and particularly those with a previous history of corticosteroid induced psychoses.
- Peptic ulceration.
- Previous steroid myopathy.
- Glucocorticoids should be used cautiously in patients with myasthenia gravis receiving anticholinesterase therapy.
- Because cortisone has been reported rarely to increase blood coagulability and to precipitate intravascular thrombosis, thromboembolism, and thrombophlebitis, corticosteroids should be used with caution in patients with thromboembolic disorders.
- Renal insufficiency.
- Tuberculosis: Those with a history of, or X-ray changes characteristic of tuberculosis. The emergence of active tuberculosis can, however, be prevented by the prophylactic use of antituberculous therapy.
- Recent myocardial infarction (rupture).
- Chickenpox: Chickenpox is of particular concern since this normally minor illness may be fatal in immunosuppressed patients. Patients (or parents of children) without a definite history of chickenpox should be advised to avoid close personal contact with chickenpox or herpes zoster and if exposed

they should seek urgent medical attention. Passive immunisation with varicella/zoster immunoglobulin (VZIG) is needed by exposed non-immune patients who are receiving systemic corticosteroids or who have used them within the previous 3 months; this should be given within 10 days of exposure to chickenpox. If a diagnosis of chickenpox is confirmed, the illness warrants special care and urgent treatment. Corticosteroids should not be stopped and the dose may need to be increased.

- Measles: Patients are advised to avoid exposure to measles, medical advice should be sought if exposure occurs. Prophylaxis with intramuscular normal immunoglobulin may be needed.
- Suppression of the inflammatory response and immune function increases the susceptibility to infections and their severity. The clinical presentation may often be atypical and serious infections such as septicaemia and tuberculosis may be masked and may reach an advanced stage before being recognised.
- The effect of corticosteroids may be enhanced in patients with hypothyroidism in those with chronic liver disease with impaired hepatic function.
- Live vaccines should not be given to individuals with impaired immune responsiveness. The antibody response to other vaccines may be diminished.
- Adrenal cortical atrophy develops during prolonged therapy and may persist for years after stopping treatment.

#### *Visual disturbance:*

Visual disturbance may be reported with systemic and topical corticosteroid use. If a patient presents with symptoms such as blurred vision or other visual disturbances, the patient should be considered for referral to an ophthalmologist for evaluation of possible causes which may include cataract, glaucoma or rare diseases such as central serous chorioretinopathy (CSCR) which have been reported after use of systemic and topical corticosteroids.

#### *Scleroderma renal crisis:*

Caution is required in patients with systemic sclerosis because of an increased incidence of (possibly fatal) scleroderma renal crisis with hypertension and decreased urinary output observed with a daily dose of 15mg or more prednisolone. Blood pressure and renal function (s-creatinine) should therefore be routinely checked. When renal crisis is suspected, blood pressure should be carefully controlled.

Pheochromocytoma crisis, which may be fatal, has been reported after administration of systemic corticosteroids. Corticosteroids should only be administered to patients with suspected or identified pheochromocytoma after an appropriate risk/benefit evaluation.

#### *Withdrawal:*

In patients who have received more than physiological doses of systemic corticosteroids (approximately 7.5mg prednisolone or equivalent) for greater than 3 weeks, withdrawal should not be abrupt. How dose reduction should be carried out depends largely on whether the disease is likely to relapse as the dose of systemic corticosteroids is reduced. Clinical assessment of disease activity

may be needed during withdrawal. If the disease is unlikely to relapse on withdrawal of systemic corticosteroids but there is uncertainty about HPA suppression, the dose of systemic corticosteroid may be reduced rapidly to physiological doses. Once a daily dose equivalent to 7.5mg of prednisolone is reached, dose reduction should be slower to allow the HPA-axis to recover. Abrupt withdrawal of systemic corticosteroid treatment, which has continued up to 3 weeks is appropriate if it is considered that the disease is unlikely to relapse. Abrupt withdrawal of doses of up to 40mg daily of prednisolone, or equivalent for 3 weeks is unlikely to lead to clinically relevant HPA-axis suppression, in the majority of patients. In the following patient groups, gradual withdrawal of systemic corticosteroid therapy should be considered even after courses lasting 3 weeks or less:

- Patients who have had repeated courses of systemic corticosteroids, particularly if taken for greater than 3 weeks.
- When a short course has been prescribed within one year of cessation of longterm therapy (months or years).
- Patients who may have reasons for adrenocortical insufficiency other than exogenous corticosteroid therapy
- Patients receiving doses of systemic corticosteroid greater than 40mg daily of prednisolone.
- Patients repeatedly taking doses in the evening.

During prolonged therapy any intercurrent illness, trauma or surgical procedure will require a temporary increase in dosage; if corticosteroids have been stopped following prolonged therapy they may need to be temporarily reintroduced.

#### *Use in children:*

Corticosteroids cause growth retardation in infancy, childhood and adolescence, which may be irreversible and therefore long-term administration of pharmacological doses should be avoided. If prolonged therapy is necessary, treatment should be limited to the minimum suppression of the hypothalamic-pituitary adrenal axis and growth retardation. The growth and development of infants and children should be closely monitored. Treatment should be administered where possible as a single dose on alternate days.

#### *Use in the elderly:*

Treatment of elderly patients, particularly if long term, should be planned bearing in mind the more serious consequences of the common side-effects of corticosteroids in old age, especially osteoporosis, diabetes, hypertension, hypokalemia, susceptibility to infection and thinning of the skin. Close clinical supervision is required to avoid life threatening reactions.

#### *Pregnancy & Lactation:*

The ability of corticosteroids to cross the placenta varies between individual drugs, however, 88% of prednisolone is inactivated as it crosses the placenta.

Administration of corticosteroids to pregnant animals can cause abnormalities of fetal development including cleft palate, intra-uterine growth retardation and effects on brain growth and development.

There is no evidence that corticosteroids result in an increased incidence of congenital abnormalities, such as cleft palate/lip in man. However, when administered for prolonged periods or repeatedly during pregnancy, corticosteroids may increase the risk of intra-uterine growth retardation. Hypoadrenalism may, in theory, occur in the neonate following prenatal exposure to corticosteroids but usually resolves spontaneously following birth and is rarely clinically important. As with all drugs, corticosteroids should only be prescribed when the benefits to the mother and child outweigh the risks. When corticosteroids are essential however, patients with normal pregnancies may be treated as though they were in the non-gravid state. Patients with pre-eclampsia or fluid retention require close monitoring. Corticosteroids are excreted in small amounts in breast milk. However, doses of up to 40mg daily of prednisolone are unlikely to cause systemic effects in the infant. Infants of mothers receiving 40mg or more daily should be monitored for signs of adrenal suppression but the benefits of breast-feeding are likely to outweigh any theoretical risk.

#### *Effects on ability to drive and use machines:*

There is no evidence to suggest that prednisolone has any effect on the ability to drive or use machines.

#### **DRUG INTERACTION:**

Co-treatment with CYP3A inhibitors, including cobicistat-containing products, is expected to increase the risk of systemic side-effects. The combination should be avoided unless the benefit outweighs the increased risk of systemic corticosteroid side-effects, in which case patients should be monitored for systemic corticosteroid side-effects.

*Hepatic microsomal enzyme inducers:* Drugs that induce hepatic enzyme cytochrome P-450 (CYP) isoenzyme 3A4 such as phenobarbital, phenytoin, rifampicin, rifabutin, carbamazepine, primidone and aminoglutethimide may reduce the therapeutic efficacy of corticosteroids by increasing the rate of metabolism. Lack of expected response may be observed and dosage of Prednisolone Tablets may need to be increased.

*Hepatic microsomal enzyme inhibitors:* Drugs that inhibit hepatic enzyme cytochrome P-450 (CYP) isoenzyme 3A4 (e.g., ketoconazole, troleandomycin) may decrease glucocorticoid clearance. Dosages of glucocorticoids given in combination with such drugs may need to be decreased to avoid potential adverse effects.

*Antidiabetic agents:* Glucocorticoids may increase blood glucose levels. Patients with diabetes mellitus receiving concurrent insulin and/or oral hypoglycemic agents may require dosage adjustments of such therapy.

*Non-steroidal anti-inflammatory drugs:* Concomitant administration of ulcerogenic drugs such as indomethacin during corticosteroid therapy may increase the risk of GI ulceration. Aspirin should be used cautiously in conjunction with glucocorticoids in patients with hypoprothrombinemia. Although concomitant therapy with salicylate and corticosteroids does not appear to increase the incidence or severity of GI ulceration, the possibility of this effect should be considered. Serum salicylate concentrations may decrease when corticosteroids are administered concomitantly. The renal clearance of salicylates is increased by corticosteroids and steroid withdrawal may result in salicylate

intoxication. Salicylates and corticosteroids should be used concurrently with caution. Patients receiving both drugs should be observed closely for adverse effects of either drug.

*Antibacterials:* Rifamycin accelerate metabolism of corticosteroids and thus may reduce their effect. Erythromycin inhibits metabolism of methylprednisolone and possibly other corticosteroids.

*Anticoagulants:* Response to anticoagulants may be reduced or less often, enhanced by corticosteroids. Close monitoring of the INR or prothrombin time is required to avoid spontaneous bleeding.

*Antiepileptics:* Carbamazepine, phenobarbital, phenytoin and primidone accelerate metabolism of corticosteroids and may reduce their effect.

*Antifungals:* Risk of hypokalemia may be increased with amphotericin, therefore concomitant use with corticosteroids should be avoided unless corticosteroids are required to control reactions; ketoconazole inhibits metabolism of methylprednisolone and possibly other corticosteroids.

*Antivirals:* Ritonavir possibly increases plasma concentrations of prednisolone and other corticosteroids.

*Cardiac Glycosides:* Increased toxicity if hypokalemia occurs with corticosteroids.

*Ciclosporin:* Concomitant administration of prednisolone and ciclosporin may result in decreased plasma clearance of prednisolone (i.e. increased plasma concentration of prednisolone). The need for appropriate dosage adjustment should be considered when these drugs are administered concomitantly.

*Cytotoxics:* Increased risk of haematological toxicity with methotrexate.

*Mifepristone:* Effect of corticosteroids may be reduced for 3-4 days after mifepristone.

*Vaccines:* Live vaccines should not be given to individuals with impaired immune responsiveness. The antibody response to other vaccines may be diminished.

*Oestrogens:* Oestrogens may potentiate the effects of glucocorticoids and dosage adjustments may be required if oestrogens are added to or withdrawn from a stable dosage regimen.

*Somatropin:* Growth promoting effect may be inhibited.

*Sympathomimetics:* Increased risk of hypokalemia if high doses of corticosteroids given with high doses of bambuterol, fenoterol, formoterol, ritodrine, salbutamol, salmeterol and terbutaline.

*Other:* The desired effects of hypoglycemic agents (including insulin), antihypertensives and diuretics are antagonized by corticosteroids; and the hypokalemic effect of acetazolamide, loop diuretics, thiazide diuretics, carbenoxolone and theophylline are enhanced.

#### **SIDE EFFECTS:**

A wide range of psychiatric reactions including affective disorders (such as irritable, euphoric, depressed and labile mood, and suicidal thoughts), psychotic reactions (including mania, delusions,

hallucinations, and aggravation of schizophrenia), behavioural disturbances, irritability, anxiety, sleep disturbances, and cognitive dysfunction including confusion and amnesia have been reported.

Reactions are common and may occur in both adults and children. Psychological effects have been reported on withdrawal of corticosteroids; the frequency is Not known. The incidence of predictable undesirable effects, including hypothalamic pituitary adrenal suppression correlates with the relative potency of the drug, dosage, timing of administration and the duration of treatment (see section Warning & Precautions).

System Organ Class	Frequency	Undesirable Effects
Infections and infestations	Not known	Increases susceptibility to and severity of infections with suppression of clinical symptoms and signs, opportunistic infections, recurrence of dormant tuberculosis (see section Warning & Precautions).
Blood and lymphatic system disorders	Not known	leukocytosis
Immune system disorders	Not known	Hypersensitivity including anaphylaxis, fatigue, malaise
Endocrine disorders	Not known	Cushingoid facies, weight gain, impaired carbohydrate tolerance with increased requirement for antidiabetic therapy, manifestation of latent diabetes mellitus, menstrual irregularity and amenorrhoea
Metabolism and nutrition disorders	Not known	Sodium and water retention, hypokalemic alkalosis, potassium loss, negative nitrogen and calcium balance
Psychiatric disorders	Not known	Euphoria, psychological dependence, depression, insomnia, dizziness, headache, vertigo, aggravation of schizophrenia, aggravation of epilepsy
Eye disorders	Not known	Increased intra-ocular pressure, glaucoma, papilloedema, posterior subcapsular cataracts, exophthalmos, corneal or scleral thinning, exacerbation of ophthalmic viral or fungal disease and vision, blurred (see section Warning & Precautions)
Cardiac disorders	Not known	Congestive heart failure in susceptible patients, hypertension
Vascular disorders	Not known	Thromboembolism
Gastrointestinal disorders	Not known	Dyspepsia, nausea, peptic ulceration with perforation and haemorrhage, abdominal distension, abdominal pain, increased appetite which may result in weight gain, diarrhoea, oesophageal ulceration, oesophageal candidiasis, acute pancreatitis
Skin and subcutaneous tissue disorders	Not known	Hirsutism, skin atrophy, bruising, striae, telangiectasia, acne, increased sweating, may suppress reactions to skin tests, pruritis, rash, urticaria

Musculoskeletal and connective tissue disorders	Not known	Proximal myopathy, osteoporosis, vertebral and long bone fractures, avascular osteonecrosis, tendon rupture, myalgia
Renal and urinary disorders	Not known	Scleroderma renal crisis*
General disorders and administration site conditions	Not known	Impaired healing, withdrawal symptoms**.

\*Scleroderma renal crisis:

Amongst the different subpopulations the occurrence of scleroderma renal crisis varies. The highest risk has been reported in patients with diffuse systemic sclerosis. The lowest risk has been reported in patients with limited systemic sclerosis and juvenile onset systemic sclerosis.

\*\*Withdrawal symptoms:

Too rapid a reduction of corticosteroid dosage following prolonged treatment can lead to acute adrenal insufficiency, hypotension and death (see section Warning & Precautions). A steroid "withdrawal syndrome" seemingly unrelated to adrenocortical insufficiency may also occur following abrupt discontinuance of glucocorticoids. This syndrome includes symptoms such as: anorexia, nausea, vomiting, lethargy, headache, fever, joint pain, desquamation, myalgia, arthralgia, rhinitis, conjunctivitis, painful itchy skin nodules weight loss, and / or hypotension.

These effects are thought to be due to the sudden change in glucocorticoid concentration rather than to low corticosteroid levels.

*Additional side effects in children and adolescents:*

Suppression of the hypothalamo-pituitary adrenal axis particularly in times of stress, as in trauma, surgery or illness, growth suppression in infancy, childhood and adolescence. Raised intracranial pressure with papilloedema (pseudotumor cerebri) in children, usually after treatment withdrawal.

#### **OVERDOSAGE AND TREATMENT:**

Reports of acute toxicity and / or death following overdosage of glucocorticoids are rare. No specific antidote is available; treatment is supportive and symptomatic. Serum electrolytes should be monitored.

#### **STORAGE:**

Store in a dry place below 30°C.  
Protect from light.  
Keep out of reach of children.  
Jauhi daripada kanak-kanak.

#### **PRESENTATION:**

Available in blister pack of 100 x 10's.

Further information can be obtained from pharmacist, physician or the manufacturer.

#### **PRODUCT HOLDER**

DUOPHARMA MANUFACTURING (BANGI) SDN.BHD.

Lot No. 2, 4, 6, 8, & 10, Jalan P/7, Section 13, Bangi Industrial Estate,  
43650 Bandar Baru Bangi, Selangor, Malaysia.

#### **MANUFACTURER**

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