Understanding Dexamethasone and Other Steroids

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Table of Contents

Introduction

You have been given this booklet to learn more about a drug called dexamethasone as well as other drugs within the same class as dexamethasone: namely, the adrenal corticosteroids (prednisone, prednisolone, and methylprednisolone). These drugs are used to treat multiple myeloma. After reading this booklet, you should know the following:

- What dexamethasone is
- How dexamethasone works
- The possible side effects of dexamethasone
- How dexamethasone is given
- Similar details about the other adrenal corticosteroids that are used in the treatment of **multiple myeloma**

This booklet is meant to provide you with general information only. It is not meant to replace the advice of your doctor, nurse, or other healthcare practitioner. Your healthcare team can answer questions related to your specific treatment plan. All words that appear in **bold type** are defined in a glossary at the end of this booklet.

What Is Multiple Myeloma?

Multiple myeloma (also known as myeloma and **plasma cell** neoplasm) is a malignancy of the **immunoglobulin**-producing plasma cells found in the **bone marrow**. It is a malignancy that involves the immune system. The

malignant plasma cells, or myeloma cells, rarely enter the blood stream. The myeloma cells accumulate in the bone marrow, causing the following:

- Disruption of normal bone marrow function, most commonly causing anemia (a low level of **red blood cells** in the bloodstream), although reduction in **white blood cell** and **platelet** counts can also occur
- Damage to bone surrounding accumulated myeloma cells
- Release of an abnormal protein, **monoclonal protein** (M protein), into the bloodstream
- Suppression of normal immune function, observed as reduced levels of normal immunoglobulins and increased susceptibility to infection

Myeloma cells can also grow in the form of localized tumors or **plasmacytomas**. Plasmacytomas may be single or multiple and either medullary (confined within bone marrow and bone) or extramedullary (outside of the bone). When there are multiple plasmacytomas inside or outside bone, this condition is also called *multiple myeloma*.

Confronted with a diagnosis of multiple myeloma, it is important for your doctor to determine the stage of the disease. Disease staging will help determine which parts of the body have been affected and to what extent. This will allow the doctor to decide upon the best treatment option.

The Stages of Multiple Myeloma

Stage I (low cell mass): Early disease. The bone structure appears normal or close to normal on x-ray images; the number of red blood cells and amount of calcium in the blood are normal or close to normal; and the amount of M protein is very low

Stage II (intermediate cell mass): An intermediate stage between stage I and III

Stage III (high cell mass): More advanced disease. One or more of the following are present:

- Anemia
- A high level of calcium in the blood
- More than 3 areas of advanced **lytic bone lesions**
- A high level of M protein in the blood or urine

Multiple myeloma is a serious malignancy, but it is treatable. Many patients experience a series of responses, relapses, and remissions. New treatments may extend the average survival of 5 years or more for patients diagnosed with multiple myeloma.

Following diagnosis, several options are available for initial or front-line therapy. For patients who may be candidates for high-dose therapy with transplant, various induction regimens can be considered including VELCADE® (bortezomib) with dexamethasone, Revlimid® (lenalidomide) with dexamethasone, thalidomide with

dexamethasone, dexamethasone alone, other dexamethasone-containing combinations, or combinations containing other adrenocortical steroids. The combination of the **alkylating agent** melphalan plus prednisone, a simple oral therapy, is an option for patients who are not considering transplant combined with intravenous high-dose melphalan; VELCADE®, Revlimid®, or thalidomide may be added to melphalan plus prednisone to improve response. At the time of relapse, newer agents are frequently required to achieve further response. Revlimid® and VELCADE® are important new agents available for use in this setting.

What Is Dexamethasone, and How Does It Work?

Dexamethasone (also known by the brand names Decadron®, Dexasone®, Diodex®, Hexadrol®, and Maxidex®) is one of the medications used in the treatment of multiple myeloma. It is a synthetic **adrenocortical steroid**. Adrenocortical steroids, also known as glucocorticosteroids or corticosteroids, are produced naturally by the adrenal glands in the body. To make things less confusing, these compounds will be referred to as the steroids throughout this brochure.

Adrenal glands produce hormones and steroids. The steroids influence many actions of the body's systems. They are involved in regulation of carbohydrates, **proteins**, and fats. They also inhibit inflammatory, allergic,

and normal immune responses. Synthetic versions can imitate the actions of the naturally occurring compounds or replace them in conditions that are associated with insufficient production of much-needed steroids that are normally produced by the adrenal glands.

Dexamethasone, a synthetic steroid, is available in many forms. It is available as an injection, in oral tablets, in solutions to treat eye infections, in nasal sprays, and in **topical** forms as a gel, cream, and spray. The injection and tablets are used to treat multiple myeloma. Dexamethasone is used to treat a wide variety of medical conditions in addition to multiple myeloma. Some of these are listed below:

- Endocrine disorders, including conditions in which the adrenal glands, for numerous reasons, do not produce enough steroids (known as adrenocortical insufficiency

and adrenal hyperplasia); thyroiditis (inflammation of the thyroid gland); or hypercalcemia (abnormally high levels of calcium caused by cancer)

- Rheumatic/collagen disorders, including various types of arthritis, **ankylosing spondylitis** (inflammation of the spine and the sacroiliac joints), **systemic lupus erythematosus** (commonly referred to as lupus), and scleroderma
- Dermatologic diseases, including some types of rashes, redness of the skin, and **mycosis fungoides** (lymphoma involving the skin)
- Allergic states, including those associated with asthma, dermatitis, drug hypersensitivity, perennial and seasonal allergies, and **serum sickness**
- Ophthalmic diseases, including a number of conditions that cause redness, swelling, and inflammation of the eyes and surrounding parts of the eyes
- Gastrointestinal (GI) diseases, such as **enteritis** (inflammation of the small intestine) and **colitis** (inflammation of the large intestine)
- Respiratory diseases, including asthma, chronic obstructive pulmonary disease, some types of pneumonia, and **sarcoidosis** (inflammation of the lymph nodes and other organs)
- Hematologic disorders, including some types of anemia, **purpura** (bleeding just below the skin), and **thrombocytopenia** (low levels of platelets in the blood)
- Neoplastic diseases (malignancies), including some types of leukemia, lymphoma, and myeloma
- **Edematous** states, including numerous conditions associated with swelling throughout the body

Dexamethasone and other steroids, particularly prednisone, prednisolone, and methylprednisolone, have many uses in the treatment of cancer. They suppress certain actions of the immune system and also inhibit **cytokines**, which are chemicals in the body that control inflammation. Dexamethasone decreases inflammation or swelling by stopping white blood cells, which normally fight infection, from traveling to areas of the body where there is swelling. Its anti-inflammatory actions can actually stop the swelling around tumors (especially on the spine, brain, and

bone) and the resulting pain and other symptoms caused by tumors pressing on nerve endings.

Dexamethasone can also alter normal immune system responses and is therefore useful in the treatment of conditions that affect the immune system, such as certain types of anemia (for example, aplastic anemia and hemolytic anemia), thrombocytopenia, and purpura.

Dexamethasone typically is given with other agents – such as vincristine, doxorubicin, VELCADE®, Revlimid®, and thalidomide – to treat multiple myeloma. It has been found that steroids can increase the ability of

chemotherapeutic and **immunomodulatory** agents to destroy myeloma cells. However, dexamethasone and other steroids are sometimes used alone to treat the disease. In fact, dexamethasone, given in high doses, is the most active single agent for treatment of multiple myeloma. Treatment can sometimes bring about remission. Dexamethasone thus offers several advantages and benefits. Response rates typically are high with dexamethasone, but **side effects** can occur.

Dosages and Dose Scheduling Used in Steroid Treatment

Front-Line Therapy

Dexamethasone is typically given alone – or in combination with another agent such as thalidomide (Thalomid®), lenalidomide (Revlimid®), or bortezomib (Velcade®) – as front-line therapy for myeloma. It is most often given orally in 4-day pulses (usually, but not always, 40 mg 4 days in a row with a varying number of days off before the next dose: for example, 4 days on/4 days off; 4 days on/10 days off; 4 days on once per month). Many oncologists are now prescribing dexamethasone in a once-weekly cycle, often at a dose lower than 40 mg. Based upon recent ECOG trial data, the once weekly dosing schedule is now more of a preferred approach. The ECOG trial evaluated the Revlimid/dexamethasone (high- and low-dose) combinations in the frontline setting. The once per week schedule "low-dose" proved

to be more effective (better survival at 1 year) and had significantly fewer side effects. Results were presented at ASCO 2007. Your doctor will work with you to find a dosing schedule that is well tolerated and appropriate to treat your multiple myeloma.

Maintenance Therapy

The steroid most commonly used as maintenance therapy is prednisone. It is given orally at 50 mg every other day. As with dexamethasone, the dose of prednisone can be reduced. The goal is to determine a dosage that will maintain a patient's response without causing side effects that compromise quality of life. Your hematologist/oncologist will work with you to determine a dose that best suits your needs and tolerance.

Relapse Therapy

Dexamethasone is most frequently used in this setting. The dosages and scheduling are as outlined for front-line approaches.

What Are Some Possible Side Effects of Dexamethasone?

As is the case with any medication, use of dexamethasone can cause some unwanted side effects. Few, if any patients, experience all of these side effects. In fact, some patients do not experience any side effects at all while taking dexamethasone. There are certain precautionary measures that patients and their healthcare team should take in order to reduce or avoid the adverse effects. The most important side effects and precautions are described here. Members of your healthcare team can provide more information in greater detail about these and other possible side effects. They also can make recommendations about managing these side effects if, and when, they occur.

The chances of side effects caused by steroids, including dexamethasone, increase with length of treatment and dose of the medication. In other words, the longer you take the drug and the higher the dose you are taking, the greater are your chances of experiencing side effects. Most of the side effects can be reversed and will go away when treatment is completed. However, do not stop taking any of your medications or reduce your doses on your own. Speak to your healthcare team if

you are experiencing any side effects or if you have any questions.

Below are some of the more common and/or more serious possible side effects (listed by body system affected), some precautions worth remembering, and some tips on how to avoid or manage adverse events.

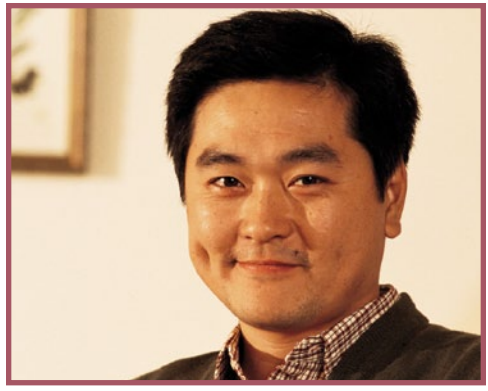
Infections

Because steroids block white blood cells from reaching sites of infection, these agents may cause existing infections to get worse or allow new infections to occur. A paradoxic effect is that the white blood cell level in the blood increases because the cells are not exiting the bloodstream to enter infected tissues. Any drugs that suppress normal immune responses can make a person susceptible to infections. Steroids may actually mask signs that an infection is present. They may also decrease a person's ability to fight the start of a new infection. Therefore, patients who are taking steroids, including dexamethasone, have an increased risk of all types of infections (bacterial, viral, or fungal).

Prevention and Treatment of Infections

Steroids, including dexamethasone, should not be administered to a patient who has a known infection. Nevertheless, there are some situations in which steroids may be important or necessary during the time that an active infection is being treated with appropriate antibiotics.

Any signs of an infection should be brought to the attention of your healthcare team as



soon as they occur. Make sure you wash your hands frequently, especially after being in public places.

Patients who have never had chickenpox or measles should be especially careful to avoid exposure. If you are exposed to either illness, you should notify someone on your healthcare team as soon as you become aware of the exposure. Patients taking dexamethasone or any steroids also should avoid being vaccinated. There are certain types of vaccine that may be given if really needed. However, consult with your healthcare team before you receive any vaccines for any reason. They can tell you if the vaccine in question is safe for you to take.

Cardiac Conditions and Fluid Retention

Use of dexamethasone and other steroids can cause increases in blood pressure, salt and water retention, and potassium and calcium excretion. These changes are more likely to occur when the drugs are taken in large

doses. Salt retention may lead to edema or swelling. You may notice that your ankles and feet are swollen. Fluid retention and loss of potassium can be a problem for patients who have cardiac conditions, especially congestive heart failure and hypertension.

Prevention and Treatment of Cardiac Conditions and Fluid Retention

Changes in diet may be needed. You may have to restrict your salt intake and take supplements to replace lost potassium and calcium. Speak with your healthcare team who will work with you to make sure that you are eating the right foods and taking the proper supplements.

Dermatologic Effects

Patients taking dexamethasone or other steroids may notice that it takes longer than usual for wounds to heal. Patients also may develop acne and rashes while taking dexamethasone. Increased sweating is also seen in some patients during steroid therapy.

Prevention and Treatment of Dermatologic Conditions

Be careful when you cut or scratch yourself. Proper hygiene is important. Wash any wound and keep the area clean. If you notice that a cut or wound isn't healing quickly or properly, you should call someone on your healthcare team. Also, do not use any over-the-counter products to treat wounds before consulting with a member of your healthcare team.

Endocrine Effects

Steroids, including dexamethasone, may interfere with the way patients metabolize carbohydrates and can cause blood glucose levels to rise. This is especially important in patients who have diabetes. Patients with known diabetes can take steroids. However, additional treatment, including insulin therapy, may be needed to control blood sugar levels.

Steroids can also cause menstrual irregularities.

Prevention and Treatment of Endocrine Effects

Patients with diabetes may need to monitor their blood glucose levels more frequently. These patients may need to adjust the doses of their insulin or diabetes medications. However, this decision needs to be made by healthcare professionals and not by patients themselves. If you have diabetes, let the doctor who is treating your diabetes know that you are taking dexamethasone.

Patients of childbearing age should be advised that the effects of steroids on the developing child are unknown. Therefore, women, especially those experiencing menstrual irregularities, should take added precautions not to become pregnant while taking dexamethasone.

Gastrointestinal Effects

Steroids can have various effects on your GI tract. They increase the risk of GI perforations. Therefore, patients who have peptic ulcers, diverticulitis, and ulcerative colitis should use corticosteroids cautiously to minimize the risk of perforation. For these reasons, many physicians automatically recommend antacid therapy of some type for patients taking steroids (eg, Pepsid®).

Other possible GI side effects seen with dexamethasone therapy are increased or decreased appetite, stomach bloating, nausea, vomiting, hiccups, and heartburn.

Prevention and Treatment of Gastrointestinal Effects

To avoid or minimize GI irritation, dexamethasone should be taken with food or after meals. Alcoholic beverages, which also irritate the stomach, should be avoided while taking dexamethasone. Limiting intake of caffeine-containing foods and drinks (such as colas, coffee, tea, and chocolate) may also help. Eating small, frequent meals may decrease nausea. Antacids taken between meals may also be helpful but should not be taken unless approved by someone on the healthcare team. Treatment for persistent hiccups may require such prescription drugs as Thorazine® or Phenergan®. If you experience any GI adverse effects while taking dexamethasone, you should tell someone on your healthcare team. They can offer advice on how to manage or avoid these unpleasant effects.

General Effects

Use of steroids, including dexamethasone, can cause weight gain.

Some patients may experience several days of hoarseness. Usually this side effect wears off, but it may linger in patients who are taking frequent 4-day pulses of dexamethasone. Resting the voice can help with this condition.

Prevention and Treatment of Weight Gain

Some weight gain is to be expected during steroid therapy. Dexamethasone has a tendency to increase patients' appetites. Patients need to control their caloric intake. Reduced carbohydrate intake is especially helpful during steroid therapy. However, if there is a sudden, large weight gain (more than 5 lbs over a day or two), you should let your healthcare team know immediately.

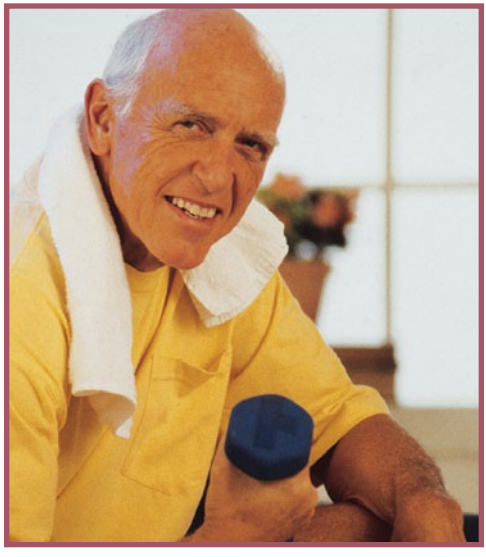
Musculoskeletal Effects

Because steroids decrease calcium absorption and increase its excretion, they affect bones. These effects can lead to pain and osteoporosis in adults. Therefore, patients most at risk for osteoporosis, especially postmenopausal women, should be cautious when taking large doses of steroids over long periods of time. You may also

experience muscle pains because you may be losing potassium.

Prevention and Treatment of Musculoskeletal Effects

You may have to take some type of supplements to replace the calcium and potassium you are losing. Do not take any supplements on your own, however. You can increase your calcium intake by eating foods that have high calcium content. Foods such as milk, cheese, yogurt, and other dairy products and some vegetables are calcium rich foods. Bananas and some other fruits and vegetables can be good sources of potassium. Consult with a member of your healthcare team first, however, before you start taking any supplements or change your diet.



Many patients with myeloma take bisphosphonate therapy as treatment for myeloma-related bone disease. This bisphosphonate therapy also combats the negative effects of steroids upon bone strength and density.

Ophthalmologic Effects

Prolonged steroid treatment may produce cataracts, elevated intraocular pressure that could lead to glaucoma, optic nerve damage, and eye infections.

Prevention and Treatment of Ophthalmologic Effects

Have your eyes checked regularly. Any change in vision should be reported immediately to your healthcare team.

Psychiatric and Neurologic Effects

Steroids can also cause irritability, mood swings, personality changes, and severe depression. They also can cause insomnia. Emotional instability or psychotic tendencies are aggravated and may become worse during steroid therapy.

Patients also have reported experiencing headaches and dizziness.

Prevention and Treatment of Psychiatric and Neurologic Effects

Contact someone on your healthcare team if you are experiencing any of the mood or personality effects listed above. Family members should be advised that you may be more irritable and difficult to live with when you are receiving steroid therapy. If you are having problems sleeping, ask a member of

your healthcare team if you can adjust the time you take dexamethasone so it doesn't interfere with your sleep during the night. Regular sleep medications can be helpful and necessary for some patients.

Allergic Reactions

Allergic and hypersensitivity reactions to steroids are possible in patients who are susceptible or have had allergic responses to other drugs. Allergic reactions can include difficulty breathing, closing of the throat, swelling of lips and tongue, and hives. Such allergic reactions to steroids are exceedingly rare.

Prevention and Treatment of Allergic Reactions

Special precaution should be used before administering dexamethasone or any other corticosteroid to patients who have histories of any type of allergic reactions to medications. Be sure to alert your healthcare team if you have a history of allergic responses when given any medication.

Remember: speak with your doctor, nurse, or someone else on your healthcare team if you notice any changes in your health.

Can Other Drugs Interact with Dexamethasone?

Interactions with other medications are definitely possible with dexamethasone. Patients with multiple myeloma typically need to take a number of medications to treat the disease as well as other medical conditions that also may be present. Chances of drug interactions increase with multiple medications. Below is a list of some (but not all) medications or classes of medications that may interact with dexamethasone. These interactions may increase or decrease the actions of any of the drugs. This is why it's important to tell all members of your healthcare team about all the prescription and over-the-counter medications, as well as herbal preparations and vitamins that you are taking.

Drugs That Can Interact with Dexamethasone and Other Corticosteroids

- Amphotericin B and diuretics that affect potassium levels, such as amiloride, spironolactone, and triamterene
- Antibiotics, such as erythromycin, clarithromycin, rifampicin, and azithromycin
- Anticoagulant medications, such as warfarin and aspirin
- Barbiturates, such as amobarbital, butalbital, pentobarbital, and secobarbital
- Diabetes medications, such as insulin, glibenclamide, metformin
- Cyclosporine
- Digitalis
- Ephedrine, which is most commonly found in weight-loss products
- Estrogen-containing medications, including oral contraceptives and hormone-replacement therapy products

- Nonsteroidal anti-inflammatory drugs (NSAIDs), including aspirin, ibuprofen, indomethacin, and naproxen
- Phenytoin

How Is Dexamethasone Given and Are There Any Special Considerations That Need to Be Noted When Taking Dexamethasone?

Dexamethasone typically is given in an infusion or orally, either with other anti-cancer agents or alone, to treat multiple myeloma. The amount of dexamethasone patients receive depends on many factors. However, to reduce the chances of side effects, the smallest dose necessary of dexamethasone that can produce the desired response should be used. Doses of dexamethasone are decided by members of the healthcare team who are familiar with each patient's medical history and case.

Dexamethasone can irritate the stomach; taking it with food can reduce the chances of this happening. Alcohol should be used cautiously or avoided altogether while taking dexamethasone, as alcohol and dexamethasone together can damage the stomach lining.

As with other glucocorticosteroids, dexamethasone therapy cannot be stopped abruptly. It is necessary to stop this group of drugs gradually. Abrupt discontinuation can lead to withdrawal symptoms.

Your healthcare team will manage how dexamethasone is administered to avoid or minimize adverse effects as much as possible.

Are Other Corticosteroids Used in the Treatment of Multiple Myeloma?

In addition to dexamethasone, other corticosteroids often are used to treat patients with multiple myeloma. These drugs are listed below.

Name of Corticosteroid	Brand Names
Prednisone	Deltasone®, Liquid Pred®, Meticorten®, Orasone®, Prednicen-M®, Sterapred®, Sterapred DS®
Prednisolone	Orapred®, Pediapred®, Prelone®
Methylprednisolone	Duralone®, Mediapred®, Medralone®, Medrol®, Predacorten®, Solu-Medrol®

Because these drugs all belong to the same class of drugs – namely, the glucocorticosteroids – they act very similarly and can be used to treat many of the same medical conditions. They behave the same way chemically in the body to treat diseases. Also, because they are so similar in their mechanisms of action, many of the side effects and associated precautions are the same. Results of clinical trials have shown

these agents all to be equally effective in the treatment of multiple myeloma.

The uses, side effects, precautions, and considerations described previously for dexamethasone are relevant for the entire class of corticosteroids and thus pertain to prednisone, prednisolone, and methylprednisolone. Prednisolone is actually a metabolite of prednisone. Methylprednisolone, although structurally similar, may be less toxic and appears to be associated with less sodium and fluid retention than prednisolone. Thus, it is worth discussing with the healthcare team if any particular type of steroid (eg, methylprednisolone vs dexamethasone) might be more useful or appropriate in your care.

As with dexamethasone, the smallest dose necessary of the corticosteroids that can produce the desired response should be used in order to avoid or minimize unwanted side effects.

For more information on multiple myeloma and treatment options, contact the IMF.

IMF Hotline:

USA & Canada only: 800-452-CURE (2873)

Elsewhere: 818-487-7455

IMF Web site: www.myeloma.org

About the IMF

"One person can make a difference,
Two can make a miracle."

Brian D. Novis
IMF Founder

Myeloma is a little-known, complex, and often misdiagnosed bone marrow cancer that attacks and destroys bone. Myeloma affects approximately 75,000 to 100,000 people in the United States, with more than 20,000 new cases diagnosed each year. Although there is presently no known cure for myeloma, doctors have many approaches to help myeloma patients live better and longer.

The International Myeloma Foundation (IMF) was founded in 1990 by Brian and Susie Novis shortly after Brian's myeloma diagnosis at the age of 33. It was Brian's dream that future patients would have easy access to medical information and emotional support throughout their battle with myeloma. He established the IMF with the three goals of treatment, education, and research. He sought to provide a broad spectrum of services for patients and, their families, friends, and healthcare providers. Although Brian died four years after his initial diagnosis, his dream did not. Today, the IMF reaches out to an international membership of more than 195,000. The IMF was the first organization dedicated solely to myeloma, and today it remains the largest.

The IMF provides programs and services to aid in the research, diagnosis, treatment,

and management of myeloma. The IMF ensures that no one must brave the myeloma battle alone.

We care for patients today, while working toward tomorrow's cure.

How Can the IMF Help You?

PATIENT EDUCATION

INFORMATION PACKAGE

Our free IMF InfoPack™ provides comprehensive information about myeloma, treatment options, disease management, and IMF services. It includes our acclaimed *Patient Handbook*.

INTERNET ACCESS

Log on to www.myeloma.org for 24-hour access to information about myeloma, the IMF, education, and support programs.

MYELOMA MANAGER™ PERSONAL CARE ASSISTANT™

This software program was developed by the IMF and is designed specifically to help patients and caregivers to capture, display, and store laboratory test results, and to access important information. It is available free of charge on the IMF website at www.myeloma.org. Currently this program is only compatible with PCs.

ONLINE MYELOMA FORUM

Join the IMF Internet Discussion Group at www.myeloma.org/listserve.html to share your thoughts and experiences.

MYELOMA MINUTE™

Subscribe to this free weekly email newsletter for up-to-the-minute information about myeloma.

IMF PATIENT & FAMILY SEMINARS™

Meet with leading experts in myeloma treatment to learn more about recent advances in therapy and research.

MYELOMA MATRIX™

On our website and in print, this document is a comprehensive guide to drugs in development for myeloma.

MYELOMA TODAY™ NEWSLETTER

Our quarterly newsletter is available free of charge by subscription.

SUPPORT

MYELOMA HOTLINE: 800-452-CURE (2873)

Toll-free throughout the United States and Canada, the IMF Hotline is staffed by trained information specialists and is in frequent interaction with members of our Scientific Advisory Board.

SUPPORT GROUPS

A worldwide network of more than 100 myeloma support groups hold regular meetings for members of the myeloma community. The IMF conducts annual retreats for leaders of myeloma support group leaders.

RESEARCH

BANK ON A CURE®

This DNA bank will provides genetic data research in new drug development.

THE INTERNATIONAL STAGING SYSTEM (ISS)

This updated staging system for myeloma enhances physicians' ability to select the most appropriate treatment for each patient.

RESEARCH GRANTS

Leading the world in collaborative research and achieving extraordinary results, the IMF

Grant Program supports both junior and senior researchers working on a broad spectrum of projects. The IMF has attracted many young investigators into the field of myeloma; they have remained in the field and are actively pursuing a cure for this disease.

Glossary

Alkylating agent: An agent that prevents the growth and division of new cancer cells by inhibiting their ability to replicate DNA.

Adrenocortical steroid: Any of the steroidal hormones produced by the adrenal cortex or their synthetic equivalents. Also known as adrenocorticoids, glucocorticosteroid, or corticosteroid.

Alkylating agent: An agent that prevents the growth and division of new cancer cells by inhibiting their ability to replicate DNA.

Ankylosing spondylitis: A form of chronic inflammation of the spine and the sacroiliac joints.

Antibody: A protein produced by some of the body's white blood cells that helps fight infection.

Apoptosis: The programmed death of a cell; believed to be governed by chemical signals a given cell receives.

Bone marrow: A soft spongy tissue found in most large bones that produces red and white blood cells and platelets.

Cell: The smallest unit of life. Millions of microscopic cells comprise each body organ.

Colitis: Inflammation of the lining of the large intestine.

Cytokine: A growth factor produced by T-cells that stimulates the growth of T cells and B cells.

Edematous: Swollen with an excessive accumulation of fluid.

Enteritis: Irritation or inflammation of the small intestine.

Hematologic malignancy: A cancer of the blood or bone marrow.

Immunoglobulin: An antibody.

Immunomodulatory agent: Drug that affects, enhances, or suppresses the immune system.

Lytic bone lesion: Dissolution or destruction of bone cells leading to holes in bone.

Metabolite: A substance that is the product of the metabolism of another substance known as a parent compound

Monoclonal protein (M protein): An abnormal protein produced by myeloma cells that accumulate in and damages bone and bone marrow. A high level of M protein indicates that myeloma cells are present in large numbers.

Multiple myeloma: A cancer arising from the plasma cells in the bone marrow. The plasma cells in patients with multiple myeloma form abnormal antibodies, possibly damaging the bone, bone marrow and other organs.

Mycosis fungoides: A blood lymphoma that stays mostly in the skin and causes a rash.

Plasma cell: A type of white blood cell that produces antibodies.

Plasmacytoma: A tumor made up of cancerous plasma cells.

Platelet: An element in the blood that helps with clotting, which in turn helps repair damaged blood vessels.

Protein: A group of compounds that are the main components of a cell.

Purpura: Bleeding that occurs just below the skin that causes purple spots and patches to appear because of the leakage of blood into the tissues under the skin

Red blood cell: A blood cell that carries oxygen from the lungs throughout the body.

Sarcoidosis: An inflammation of the lymph nodes and other organs.

Scleroderma: A connective tissue disorder characterized by tightening of the skin of the arms, face or hands, puffy hands and feet, and joint stiffness and pain that can affect one part of the body or the entire body.

Serum sickness: A hypersensitive reaction caused by the administration of a foreign serum; it causes fever, swelling, skin rash, and enlargement of the lymph nodes.

Side effect: An effect caused by the treatment with a drug. The term usually refers to an unwanted effect, but some side effects may be beneficial.

Systemic lupus erythematosus (SLE): A chronic, inflammatory autoimmune disorder that can affect the skin, joints, kidneys, and other organs.

Thrombocytopenia: A low level of platelets in the blood. These low levels can cause bruising or bleeding as well as delay in the injury healing process.

Topical: pertaining to body surfaces such as the skin or mucous membranes

White blood cell: A cell made by the bone marrow that helps fight infection and/or disease.