

Understanding
Myeloma
Vocabulary



February 2024 Edition

A publication of the **International Myeloma Foundation**



Founded in 1990, the International Myeloma Foundation (IMF) is the first and largest organization focusing specifically on myeloma. The IMF's reach extends to more than 525,000 members in 140 countries. The IMF is dedicated to improving the quality of life of myeloma patients while working toward prevention and a cure through our four founding principles: Research, Education, Support, and Advocacy.

RESEARCH The IMF is dedicated to finding a cure for myeloma, and we have a range of initiatives to make this happen. The International Myeloma Working Group, which emerged from the IMF's Scientific Advisory Board established in 1995, is the most prestigious organization with more than 300 myeloma researchers conducting collaborative research to improve outcomes for patients while providing critically appraised consensus guidelines that are followed around the world. Our Black Swan Research Initiative® is bridging the gap from long-term remission to cure. Our annual Brian D. Novis Research Grant Program is supporting the most promising projects by junior and senior investigators. Our Nurse Leadership Board, comprised of nurses from leading myeloma treatment centers, develops recommendations for the nursing care of myeloma patients.

EDUCATION The IMF's webinars, seminars, and workshops provide up-to-date information presented by leading myeloma scientists and clinicians directly to patients and their families. We have a library of more than 100 publications for patients, care partners, and healthcare professionals. IMF publications are always free-of-charge, and available in English and select other languages.

SUPPORT The IMF InfoLine responds to your myeloma-related questions and concerns via phone and email, providing the most accurate information in a caring and compassionate manner. We also sustain a network of myeloma support groups, training hundreds of dedicated patients, care partners, and nurses who volunteer to lead these groups in their communities.

ADVOCACY We empower thousands of individuals who make a positive impact each year on issues critical to the myeloma community. In the U.S., we lead coalitions to represent the interests of the myeloma community at both federal and state levels. Outside the U.S., the IMF's Global Myeloma Action Network works to help patients gain access to treatment.

**Learn more about the ways the IMF is helping
to improve the quality of life of myeloma patients
while working toward prevention and a cure.
Call us at 1.818.487.7455 or 1.800.452.CURE,
or visit myeloma.org.**

Improving Lives **Finding the Cure**®

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You are not alone

The International Myeloma Foundation (IMF) is here to help you. The IMF is committed to providing information and support for patients with **multiple myeloma** (which we refer to simply as “myeloma”) and their care partners, friends, and family members.

We achieve this through a broad range of resources available on our website myeloma.org, and through numerous programs and services such as seminars, webinars, workshops, and the **IMF InfoLine**, which consistently provides the most up-to-date and accurate information about myeloma in a caring and compassionate manner. Contact the IMF InfoLine at 1.818.487.7455 or InfoLine@myeloma.org.

What you will learn from this booklet

Myeloma is a **cancer** that is not known to most patients at the time of diagnosis. To play an active role in your own medical care and to make good decisions about your care with your doctor, it is important and helpful to learn about myeloma, as well as its treatment options and supportive care measures.

The IMF’s *Understanding-series publications* address treatments for myeloma, supportive care measures, and the tests that are used to diagnose, monitor, and assess disease status throughout its course.

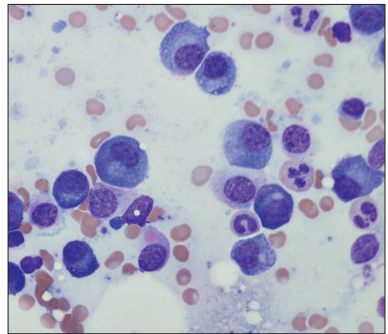
Myeloma is a complicated disease, but the language that describes it doesn’t have to be hard to understand. This booklet contains myeloma-related terms and definitions that may be used in your discussions with your doctor, who is best able to answer questions about your specific healthcare management plan.

If you are newly diagnosed with myeloma, we suggest that you read the IMF’s publication *Patient Handbook for the Newly Diagnosed*, which will help you to better understand this complex disease.

To learn about myeloma in later disease settings, read the IMF’s publication *Concise Review of Relapsed and Refractory Myeloma*.

If you are reading this booklet in electronic format, the **light blue links** will take you to the corresponding resources. All IMF publications are free-of-charge and can be downloaded or requested in printed format at publications.myeloma.org.

Figure 1. Myeloma cells in the bone marrow



Myeloma-related terms from A to Z

A

Acute: In reference to disease, of sudden onset or of short duration, rapidly progressive, and in need of immediate care.

Acute tubular necrosis (ATN): Damage to or destruction of epithelial cells that form the renal (kidney) tubules, tiny ducts that help filter the blood when it passes through the kidneys. ATN can lead to acute renal failure. It may be possible to recover kidney function if not all of the tubular cells are affected.

Administration-related reaction (ARR): Reaction to treatment administered as an intravenous (IV) infusion or a subcutaneous (SQ) injection. See “**Infusion-related reaction (IRR)**” and “**Cytokine.**”

Adrenal glands: Glands located at the top of the kidneys that are chiefly responsible for releasing sex hormones and cortisol, a hormone that helps human beings respond to stress.

Adverse event (AE): See “**Side effect.**”

Aiolos: An Ikaros family protein. See “**Ikaros.**”

Albumin (ALB): Water-soluble protein found in serum (blood). When myeloma is very active, production of albumin is inhibited by interleukin-6. See “**Interleukin.**”

Albuminuria: The presence of an excess of serum albumin in the urine.

Alkylating agent: A chemotherapy agent that crosslinks the DNA of myeloma cells and blocks cell division. Alkylating agents were the earliest effective drugs used in the treatment of myeloma. Melphalan and cyclophosphamide are examples of alkylating agents currently used to treat myeloma.

Allergen: A substance that causes an allergic reaction.

Allergenic: Licensed and regulated products used for diagnosis or treatment of allergic diseases, or to determine the cause of allergic diseases.

Allogeneic transplant: See “**Transplant.**”

Amyloid lightchain (AL) amyloidosis: AL amyloidosis is a plasma cell disorder in which light chain proteins are not excreted by the kidneys, but become crosslinked with each other, and these amyloid fibrils are then deposited in tissues and organs. See “**Amyloidosis.**”

Amyloidosis: A group of systemic diseases characterized by the deposition of amyloid protein in various organs or tissues. AL amyloidosis is the one type of amyloidosis that is related to myeloma. See “**Amyloid lightchain (AL) amyloidosis.**”

Analgesic: Any drug that relieves pain. Aspirin and acetaminophen are mild analgesics.

Analog: A chemical compound that is structurally similar to another but differs slightly in composition.

Anemia: Red blood cells contain hemoglobin, a protein that carries oxygen to the body's tissues and organs. Anemia is usually defined as a decrease in hemoglobin < 10 g/dL or as a decrease of ≥ 2 g/dL from the normal level for an individual. More than 13–14 g/dL is considered normal. Low levels of oxygen in the body may cause shortness of breath and feelings of exhaustion. Many newly diagnosed myeloma patients have anemia.

Anesthesia: Loss of feeling or awareness. Local anesthesia causes loss of feeling in a part of the body. General anesthesia induces loss of sensation in the entire body that can cause loss of consciousness.

Angiogenesis: Blood vessel formation, which usually accompanies the growth of malignant tissue, including myeloma.

Angiogenesis inhibitors: Compounds that reduce new blood vessel formation associated with cancer cell growth.

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

Anti-emetic agent: A drug that prevents or controls nausea and vomiting.

Anti-inflammatory: A substance or treatment that reduces inflammation or swelling.

Antibiotics: Drugs used to treat bacterial infections.

Antibody: A protein produced by plasma cells in response to an antigen that enters the body. See "**Immunoglobulin (Ig)**."

Antibody-drug conjugate (ADC): An anti-cancer therapy that links a monoclonal antibody directed at cancer cells with a drug that is toxic to cancer cells.

Antifungal agent: A drug used to treat fungal infections.

Antigen: Any foreign substance that causes the immune system to produce natural antibodies. Examples of antigens include bacteria, viruses, parasites, fungi, and toxins.

Antihistamine: A drug that acts against histamine, a powerful and highly irritant agent released in the body after contact with certain allergens.

Antineoplastic agent: A drug that prevents, kills, or blocks the growth and spread of cancer cells.

Anti-oncogene: A gene that makes a protein called a tumor suppressor gene, which protects a cell on the path to cancer. See "**Oncogene**" and "**Tumor suppressor gene.**"

Apheresis: A procedure that uses a machine to separate whole blood so that one specific component can be collected while other components are immediately re-infused back into the bloodstream of the patient or donor.

Appendicular skeleton: The part of the skeleton consisting of the appendages: the bones of the arms and legs.

Apoptosis: A normal cellular process leading to the death of a cell.

Arrhythmia: An arrhythmia is a problem with the rate or rhythm of the heartbeat. It means that the heart beats too quickly, too slowly, or with an irregular pattern. Arrhythmias are caused by problems with the heart's electrical conduction system.

Aspiration: The process of removing fluid or tissue, or both, from a specific area such as the bone marrow.

Asthenia: A condition in which the body lacks or has lost strength either as a whole or in any of its parts.

Asymptomatic: Producing or showing no signs or symptoms.

Asymptomatic myeloma: See "**Smoldering multiple myeloma (SMM).**"

Atherosclerosis: The deposits of fats, cholesterol, and other substances inside the artery walls.

Autoantibody: An antibody produced by an individual's immune system in response to one or more of that individual's own proteins. Autoantibodies can target a person's own tissues and/or organs, and may cause autoimmune disorders such as lupus, rheumatoid arthritis, Type 1 diabetes, and others. See "**Antibody.**"

Autocrine: The process whereby a growth factor is produced by a cell, such as a myeloma cell, while also stimulating the cell to grow, creating a positive feedback loop. Also see "**Paracrine.**"

Autoimmune disease: A condition that occurs when the immune system abnormally creates antibodies to a normal body part. Common autoimmune diseases include Type 1 diabetes, celiac disease, inflammatory bowel disease, multiple sclerosis, psoriasis, and rheumatoid arthritis.

Autologous transplant: See "**Transplant.**"

Autonomic nervous system: The part of the nervous system that regulates functions of organs over which we have no conscious control. The autonomic nerves connect the spinal cord to the internal organs, including the blood vessels, stomach, intestines, lungs, liver, kidneys, bladder, and heart.

Axial skeleton: Consists of spine, pelvis, ribs, and skull. The axial skeleton is most commonly affected by myeloma, along with the upper ends of the long bones of the arms and legs.

B

B-cell maturation antigen (BCMA): A protein involved in myeloma cell growth and survival. BCMA is found on the surface of cells in all patients with myeloma. Also called “tumor necrosis factor receptor superfamily member 17 (TNFRSF17).”

B cells (B lymphocytes): White blood cells that are part of the natural immune system. Some B cells develop into plasma cells in the bone marrow and are the source of antibodies.

Bacteria: Single-celled microorganisms that can exist either as independent (free-living) organisms or as parasites (dependent on another organism for life). The plural of bacterium.

Baseline: The initial known data that is gathered and used for comparison with later data.

Basophil: A type of white blood cell. Basophils help prevent blood from clotting and release histamine during allergic reactions. Neutrophils, basophils, and eosinophils are all types of white blood cells known as granulocytes.

Bence-Jones myeloma: Myeloma characterized by the presence of Bence-Jones protein, an abnormal protein in urine made up of free kappa or lambda light chains. See “**Bence-Jones protein.**”

Bence-Jones protein: A myeloma monoclonal protein. The protein is composed of either free kappa or free lambda light chains. Because of their small size, Bence-Jones light chains can be filtered through the kidneys and pass into the urine. The amount of Bence-Jones protein in the urine is expressed in terms of grams per 24 hours. Normally, a very small amount of protein (< 0.1 g/24 h) can be present in the urine, but this is albumin rather than Bence-Jones protein. The presence of any Bence-Jones protein in the urine is abnormal. Myeloma protein heavy chains are too large to be filtered through the kidneys. See “**Bence-Jones myeloma.**”

Benign: Not cancerous; does not invade nearby tissue or spread to other parts of the body.

Beta-2 microglobulin (β 2-microglobulin, β_2M , or β 2M): A small protein found in the blood. High levels occur in patients with active myeloma. Low or normal levels occur in patients with early myeloma and/or inactive disease. Approximately 10% of patients have myeloma that does not produce β 2M. At the time of relapse, β 2M can increase before there is any change in the myeloma protein level. Factors such as viral infection can sometimes produce elevated serum β 2M levels.

Biologics: Products that are composed of living organisms or contain components of living organisms. Biological products include vaccines, blood and blood components, cells, genes, tissues, allergenics, and recombinant therapeutic proteins. Biologics are used to treat numerous diseases and conditions. Also see "**Biosimilars.**"

Biomarker: A measurable molecule found in body fluids or tissues that can provide information about a process, condition, or disease. In myeloma, biomarkers are used to help choose the most appropriate treatment as well as to assess response treatment. Also called tumor markers.

Biopsy: The collection of tissue for microscopic examination to aid in diagnosis.

Biosimilars: Products with a molecular structure that is similar to but not an exact match with the original reference product. Biosimilars have no clinically meaningful difference from the original reference product in terms of safety profile, purity, and potency. Also see "**Biologics.**"

Bispecific antibody: An artificial antibody that binds to two ("bi") targeted cells.

Bisphosphonate: A type of drug that protects against osteoclast activity (bone breakdown) and binds to the surface of bone where it is being resorbed or destroyed.

Blood cell: A structure in the bone marrow that typically includes red blood cells, white blood cells, and platelets.

Blood count: The number of red blood cells, white blood cells, and platelets in a sample of blood.

Blood glucose: A type of blood sugar that the body produces from the food in our diet. Glucose is transported via the bloodstream to all the cells in our body. It is our primary source of energy. Certain medications can affect our blood glucose levels. There are tests that measure and monitor blood glucose.

Blood stem cells: Stem cells in the bone marrow that are responsible for making all the blood cells. The medical term is “hematopoietic” stem cells.

Blood urea nitrogen (BUN): A measure of the urea level in the blood. Urea is excreted by the kidneys. BUN is a laboratory blood test to assess kidney function. Diseases such as myeloma, which can compromise kidney function, frequently lead to increased levels of BUN in the bloodstream.

Bone marrow: The soft, spongy tissue in the center of bones that produces white blood cells, red blood cells, and platelets. When myeloma is growing, myeloma cells build up in the bone marrow.

Bone marrow aspiration: The removal, by a needle, of a sample of fluid and cells from the bone marrow for examination under a microscope.

Bone marrow biopsy: The removal, by a hollow-bore needle, of a sample of tissue from the bone. The tissue cells are checked to see whether they are cancerous. If cancerous plasma cells are found, the pathologist estimates how much of the bone marrow is affected. Bone marrow biopsy is usually done at the same time as bone marrow aspiration.

Bone marrow failure: When the bone marrow is unable to produce enough healthy blood cells. Bone marrow failure can be acquired or inherited. It can be fatal if left untreated.

Bone marrow transplant: See “**Transplant.**”

Bone-modifying agent (BMA): A class of drugs used to prevent or treat bone breakdown. In myeloma, BMAs include Xgeva® (denosumab), Zometa® (zoledronic acid), and Aredia® (pamidronate).

Bone remodeling: The normal coordination (coupling) between osteoclast cells (which resorb or destroy bone) and osteoblast cells (which create new bone matrix) to maintain a balanced state of bone production and destruction.

C

C-reactive protein (CRP): A protein made in the liver that increases in amount when there is inflammation throughout the body.

Calcium: A mineral found mainly in the hard part of bone matrix (hydroxyapatite). If produced or released in excess, it can build up in the bloodstream. See “**Hypercalcemia.**”

Cancellous bone: Also known as trabecular bone; the light, porous bone enclosing numerous large spaces that give it a sponge-like appearance. Trabecular bone contains marrow and blood vessels.

Cancer: A term for diseases in which malignant cells divide without control. Cancer cells can invade nearby tissues and spread through the bloodstream and lymphatic system to other parts of the body.

Carcinogen: Any substance or agent that produces or stimulates cancer growth.

Catheter: A tube that is placed in a blood vessel to provide a pathway for drugs or nutrients. A central venous catheter (CVC) is special tubing that is surgically inserted into a large vein near the heart and exits from the chest or abdomen. The catheter allows medications, fluids, or blood products to be given and blood samples to be taken.

CD34+: Cluster of differentiation (CD) 34 is a cell surface protein on hematopoietic stem cells. The CD34-positive laboratory marker on the surface of hematopoietic stem cells is used to select and to quantify the stem cells. A specified minimum number of CD34+ stem cells is required to safely support a transplant procedure.

Cell: The basic unit of any living organism. Millions of microscopic cells comprise each organ and tissue in the body.

Cell differentiation: The process during which young, immature (unspecialized) cells develop individual characteristics and reach their mature (specialized) form and function.

Cell proliferation: An increase in the number of cells as a result of cell growth and cell division.

Central nervous system (CNS): The part of the nervous system consisting of the brain and spinal cord. The CNS is made up of nerve cells and groups of nerves that transmit messages between the brain and the rest of the body.

Cereblon E3 ligase modulatory drug (CELMoD): This drug class is new in myeloma. There are several CELMoDs being investigated in myeloma clinical trials but none have received FDA approval as of early 2024. CELMoDs have similarities with immunomodulatory agents, but CELMoDs are able to be used even in patients who have relapsed after treatment with immunomodulatory agents.

Checkpoint inhibitor: A safety mechanism built into our immune system to help keep immune responses in check. Checkpoint inhibitors that block “programmed cell death protein 1” (PD-1) reduce the deactivation of T cells and enhance the ability of T cells to kill cancer cells.

Chemokine: A type of secreted protein within the cytokine family whose function is to induce cell migration. See “**Cytokine.**”

Chemotherapy: Any drugs used to kill cancer cells. “Combination chemotherapy” uses more than one drug in a cancer treatment regimen.

Chimeric antigen receptor (CAR) T-cell therapy: In myeloma, this immunotherapy involves collecting the patient’s T cells, and engineering them to attack the patient’s own cancer cells.

Chromatid: One of two identical chromosomal strands into which a chromosome splits before cell division.

Chromosome: A strand of DNA and proteins in the nucleus of a cell. Chromosomes contain genes and function in the transmission of genetic information. Normally, human cells contain 46 chromosomes (23 pairs).

- **Chromosomal deletion** – Genetic mutation in which part or all of a chromosome is lost during DNA replication. Chromosomal deletions that occur in myeloma include loss of the long arm of chromosome 13 (written as 13q–) or loss of the short arm of chromosome 17 (written as 17p–).
- **Chromosomal translocation** – Genetic mutation in which parts of different chromosomes are rearranged. Written with a lowercase “t” followed by the numbers of the chromosomes with translocated genetic material. Translocations that occur in myeloma include t(4;14), t(11;14), t(14;16), and t(14;20).

Chronic: Persisting over a long period of time.

Clinical: Involving direct observation or examination of a patient.

Clinical trial: A medical research study with people who volunteer to test scientific approaches to a new treatment or a new combination therapy. Each clinical trial is designed to find better ways to prevent, detect, diagnose, or treat cancer and to answer scientific questions.

- **Accrual** – The process of enrolling patients in a clinical trial, or the number of patients already enrolled or anticipated to be enrolled in a clinical trial.
- **Arm** – A treatment group in a randomized study, in which there are two or more arms.
- **Cohort** – A group of patients in the same study receiving the same treatment or placebo.
- **Control group** – The arm of a randomized clinical trial that receives the standard treatment or placebo.
- **Double-blind** – When neither the patient nor the investigator knows the arm of the trial to which the patient is randomized. The purpose is to eliminate any bias in the reporting of results.

- **Endpoint** – The goal of the study. A clinical trial endpoint may aim to measure toxicity, response rate, or survival.
- **Experimental group** – The arm of a randomized trial that gets the new treatment.
- **Placebo** – An inert (inactive) substance often used in clinical trials for comparison with an experimental drug. No clinical trial for cancer patients in the U.S. can ethically or legally randomize patients to receive a placebo alone when they require treatment. In the placebo arm of a cancer treatment trial, patients receive treatment with approved therapy *plus* a placebo.
- **Randomized clinical trial** – A study in which patients are randomly assigned to receive a particular treatment.
- **Phase I clinical trial** – A study to determine the maximum-tolerated dose (MTD) and safety profile of a new drug or a new combination of drugs. It may be the first testing of a new treatment in humans. Please note that in combination therapies, the individual elements may already have been well tested in humans.
- **Phase II clinical trial** – A study designed to determine the efficacy and safety of a new therapy that has been tested in a phase I trial. Patients are usually required to have measurable disease that is refractory to any standard treatment. If the results of a phase II study are clearly much better than the standard treatment, then the treatment may be approved without being tested in a phase III study. If results from a phase II study are promising, the treatment may then be tested in a phase III study.
- **Phase III clinical trial** – A study that compares two or more treatments. The endpoint of a phase III study may be survival or progression-free survival (PFS). Phase III studies are usually randomized, so patients don't choose which treatment they receive. Some phase III trials compare a new treatment that had good results in phase II study with a standard-of-care treatment; other phase III studies compare treatments that are already in common use.
- **Phase IV clinical trial** – Even after a drug has been approved by the U.S. Food and Drug Administration (FDA) for use in a particular indication, there may be need for additional studies. For example, safety surveillance is designed to detect any rare or long-term side effects over a larger patient population and longer time period than was possible during the phase I–III clinical trials.

Colony-stimulating factor (CSF): Proteins that stimulate the development and growth of blood cells. Neupogen® (filgrastim), Neulasta® (pegfilgrastim), and Leukine® (sargramostim) are colony-stimulating factors that are used to mobilize stem cells from the bone marrow into the bloodstream prior to apheresis. These may also be used after the transplant to hasten blood count recovery, or to treat low white cell count caused by therapy.

Complement proteins: A complex system of more than 30 proteins that act in concert to help eliminate infectious microorganisms. The complement system causes the lysis (bursting) of foreign and infected cells, the phagocytosis (ingestion) of foreign particles and cell debris, and the inflammation of surrounding tissue.

Complete blood count (CBC): Many cases of MGUS, SMM, and myeloma are identified as the result of this routine blood test, which quantifies all the cells that make up the solid parts of blood. The CBC is usually performed as part of an annual medical exam, and it is also one of the tests needed for diagnosing and monitoring patients with myeloma.

Complete response: See “**Response or remission.**”

Computed axial tomography (CAT or CT): Creates three-dimensional images of structures inside the body. In myeloma, used when X-rays are negative or for more detailed scanning of specific areas. Especially useful for detection or detailed evaluation of small areas of bone damage or nerve pressure.

Conditioning regimen: A treatment given to a patient to destroy cancer cells prior to stem cell transplant. The most common conditioning regimen given to myeloma patients is 200 mg of melphalan per square meter of body mass.

Congestive heart failure: A condition that occurs when the heart’s pumping function is weakened, causing a series of events that result in the body retaining fluid and salt. If fluid builds up in the arms, legs, feet, ankles, lungs, or other organs, the body becomes congested.

Consolidation therapy: Treatment that may be given to deepen the patient’s response after an autologous stem cell transplant (ASCT). Usually, consolidation therapy is the same regimen used for induction therapy.

CRAB criteria: An elevated level of **Calcium** in the blood, **Renal** (kidney) damage, **Anemia** or low red blood cell count, and **Bone** damage are criteria used to diagnose myeloma along with “**Myeloma-defining event (MDE).**”

Creatinine: A chemical compound normally excreted by the kidneys into the urine. If the kidneys are damaged, the serum level of creatinine builds up. The serum creatinine test is used to measure kidney function.

CT scan: See “**Computed axial tomography (CAT or CT).**”

Cycle: Cancer patients often receive treatment at regular intervals, which can be measured in days or weeks and include a period of therapy followed by a period of rest. One Cycle is the amount of time that elapses between the start of a round of therapy and the start of the next round of therapy.

Cyst: An accumulation of fluid or semi-solid material within a sac. A cyst can occur in any organ or tissue.

Cytogenetics: Laboratory testing that looks for missing, rearranged, or extra chromosomes. See “**Chromosome.**”

Cytokine: A protein that circulates in the bloodstream, usually in response to infection. Cytokines can stimulate or inhibit the growth or activity in other cells.

Cytokine release syndrome (CRS): A potentially fatal, uncontrolled immune reaction in which cytokines become highly elevated and trigger an overwhelming immune system response. A cytokine “storm” can seriously damage body tissues and organs. See “**Cytokine.**”

Cytopenia: A condition in which there is a lower-than-normal number of red blood cells (anemia), white blood cells (leukopenia), or platelets (thrombocytopenia). Pancytopenia is a condition in which all of a person’s blood cell levels are low.

Cytoplasm: The jellylike material inside the membrane of a human cell, excluding the cell’s nucleus.

D

Deep vein thrombosis (DVT): A condition that occurs when a blood clot (thrombus) forms in one or more of the deep veins in the body, usually in the legs. A blood clot from a DVT can break loose (embolize) and travel to the heart or lungs. An embolus is potentially life-threatening. DVT can occur without any symptoms, or it can cause leg pain or swelling.

Dehydration: Excessive loss of water from the body. Symptoms and signs include thirst, dry mouth, weakness or lightheadedness (particularly if worse on standing up), dark urine, and a decrease in urination. Heat exposure, prolonged vigorous exercise, kidney disease, vomiting or diarrhea, as well as certain medications may lead to dehydration.

Dendritic cell: Dendritic cells boost immune response by activating helper T cells and stimulating them to release cytokines. Dendritic cells are one type of antigen-presenting cells (APC) that show antigens on their surface to other immune system cells for recognition and destruction, affecting long-term disease control and treatment outcome.

Deoxyribonucleic acid (DNA): The substance of heredity; a large molecule that carries the genetic information that cells need to replicate and to produce all components of the body.

Depth of response (DpR): In myeloma, research studies have demonstrated DpR to be a predictor of statistically superior outcomes, including prolonged progression-free survival (PFS) and overall survival (OS) in patients achieving at least a very good partial response (VGPR) during treatment.

Diagnosis: The process of identifying a disease by its signs, symptoms, and test results.

Dialysis: The process of removing water, excess salt, and toxins from the blood when a person's kidneys are no longer capable of doing so. The two types of dialysis are hemodialysis, which uses a machine, and peritoneal dialysis, which uses the lining of the abdomen (the peritoneum), to filter the blood.

Disease-free survival: The length of time the patient survives after treatment without any detectable cancer. This is also called "**Progression-free survival (PFS)**."

Disease progression: See "**Progressive disease**."

Disease stabilization: When cancer stops growing and remains stable.

Dose-limiting toxicity (DLT): When the side effects of the treatment are severe enough to prevent giving more of the same treatment.

Down-regulation: The process by which a cell decreases the quantity of a cellular component, such as RNA or protein, in response to an external variable.

Drug class: A group of medications that have a similar chemical structure or a similar mechanism of action (MoA).

Drug resistance: When a drug becomes less effective and the patient's cancer cells become more resistant to therapy.

Dual-energy X-ray absorptiometry (DXA, previously DEXA) study: An enhanced form of X-ray technology used to measure bone loss.

Duration of response (DoR): The length of time from onset of response to disease progression or death.

Dyspnea: The medical term for shortness of breath, often described as an intense tightening in the chest, air hunger, difficulty breathing, or breathlessness. Dyspnea can be caused by a host of medical problems, including anemia, pneumonia, or a pulmonary embolism.

Edema: An abnormal accumulation of fluid in part of the body. Edema is the result of accumulation of excess fluid under the skin in the spaces within the tissues, or “interstitial” spaces. Peripheral edema is accumulation of fluid that causes swelling in the ankles, feet, and legs.

Efficacy: Ability of treatment to produce a beneficial effect.

Electrolytes: Minerals in your blood and other body fluids that carry an electrical charge and are essential for life. Electrolytes include sodium, potassium, calcium, magnesium, chloride, phosphate, and bicarbonate. They affect the amount of water in the body, the acidity of the blood (pH), nerve and muscle function (including the heart), and other important processes.

Electrophoresis: A laboratory test used both for diagnosis and for monitoring, in which a patient’s serum (blood) or urine proteins are subjected to separation according to their size and electrical charge. Serum or urine electrophoresis (SPEP or UPEP) enables both the calculation of the amount of myeloma protein and the identification of the type of M-spike for each patient.

Embryo-fetal toxicity: Exposure of an embryo or a fetus to a toxic substance. Females of reproductive potential and males with female partners of reproductive potential should ask the treating doctor if the use of effective contraception is necessary before treatment begins, during treatment, and/or after the last dose of treatment is administered.

Encephalopathy: Any brain disease that alters brain function or structure. Causes may include infection, tumor, or stroke. Symptoms may include reduced ability to reason or concentrate, memory loss, personality change, twitching, or seizures.

Engraftment: The process by which stem cells in the transplanted bone marrow or peripheral blood migrate to the patient’s bone marrow and begin to grow and produce new white blood cells, red blood cells, and platelets.

Enzyme: A protein molecule manufactured by a cell. An enzyme acts as a catalyst that increases the rate of a specific biochemical reaction in the body.

Erythrocytes: Red blood cells (RBCs). RBCs carry oxygen to body cells and carbon dioxide away from body cells.

Erythropoiesis: The formation of new red blood cells.

Erythropoietin: A hormone produced by the kidneys that stimulates the production of red blood cells. Myeloma patients with damaged kidneys don’t produce enough erythropoietin and can become anemic.

Esophagitis: Inflammation of the esophagus, which is the tube that transports food from the mouth to the stomach.

Extramedullary disease (EMD): The presence of plasma cells outside the bone marrow in a patient with myeloma.

Extramedullary plasmacytoma: A tumor of monoclonal plasma cells that is found in soft tissue outside of the bone marrow and separate from bone.

Extravasation: Passage or escape of a drug (such as intravenous chemotherapy) or bone cement (during vertebroplasty or kyphoplasty) into surrounding tissue.

F

Facet joint: The connection between the bones of the spine.

Fanconi syndrome: A type of selective kidney tubular damage that affects how kidneys reabsorb certain essential substances. Leakage of amino acids and phosphates into the urine, then exiting your body in the urine, can cause metabolic bone disease.

Fatigue: Fatigue caused by cancer or cancer treatment is a distressing, persistent, subjective sense of tiredness or exhaustion that is not proportional to recent activity and interferes with usual functioning.

Febrile neutropenia: The development of fever, often with signs of infection, in a patient with neutropenia. Febrile neutropenia is usually treated with antibiotics even if an infectious source can't be identified. See "**Neutropenia.**"

Fluorescence *in situ* hybridization (FISH): A procedure that allows myeloma specialists to locate the positions of specific DNA sequences on chromosomes.

Flow cytometry: A technology used in cell counting, cell sorting, and biomarker detection by suspending cells in a stream of fluid and passing them through a laser.

Free light chain (FLC): An immunoglobulin light chain is the smaller of two units that make up an antibody. There are two types of light chain: kappa and lambda. A light chain may be bound to a heavy chain or it may be unbound (free). Free light chains circulate in the blood and are small enough to pass into the kidneys, where they may be filtered out into the urine or may stick together and block the kidney's tubules.

Frontline therapy: A general term for the initial treatment used in an effort to achieve response in a newly diagnosed myeloma patient. See "**Induction therapy**" and "**Response or remission.**"

Gastrointestinal (GI) side effects: Nausea, vomiting, diarrhea, constipation, bloating, or any other side effects that affect the digestive tract.

Gene: A specific sequence of DNA coding for a particular protein.

Gene therapy: Treatment that alters the activity of genes. This usually implies adding or removing a gene or genes.

Generic drug name: A brand name identifies a drug as property of the company that receives approval for it from a governmental regulatory agency, such as the U.S. Food and Drug Administration (FDA). After a drug goes “off patent,” other companies may make generic versions of the drug under a generic name that refers to the chemical makeup of a drug.

Genetic: Relating to genes or heredity in all living organisms. The biological process by which characteristics are passed from parent to offspring through DNA in the genes.

Glaucoma: A disease associated with the buildup of pressure inside the eye that, if untreated, can result in vision loss and blindness.

Globulin: A protein made in the liver by the immune system. Globulins that play an important role in liver function, blood clotting, and fighting infection include “alpha,” “beta,” and “gamma.” M-protein secreted by myeloma cells is a gamma globulin.

Glycoproteins: Proteins on the outer surface of cells that have sugars (carbohydrates) attached to them. They function as receptor sites where other molecules may attach to the cell.

Grade: The toxicity criteria adopted in the United States by the National Cancer Institute (NCI) for cancer clinical trials includes:

- **Grade 0** – no symptoms,
- **Grade 1** – mild symptoms,
- **Grade 2** – moderate symptoms,
- **Grade 3** – symptoms requiring treatment,
- **Grade 4** – symptoms requiring urgent intervention,
- **Grade 5** – symptoms resulting in death.

Graft-versus-host disease (GVHD): An immune-related reaction of donated tissue against the recipient’s own tissue.

Granulocyte: A type of white blood cell that kills bacteria. Neutrophils, eosinophils, and basophils are all types of granulocytes.

Growth factors: Drugs that stimulate blood stem cells to both grow and be released into the bloodstream.

Guillain-Barré syndrome (GBS): A rare neurological disorder in which the immune system mistakenly attacks part of the patient's own network of nerves located outside of the brain and spinal cord. Cases of GBS can be mild (brief weakness) or severe (paralysis). Most patients eventually recover but some will continue to have a degree of weakness.

H

Heavy chain: An immunoglobulin protein produced by plasma cells is made up of 2 heavy chains and 2 light chains, with the heavy chains being the larger of the two units. The 5 types of heavy chains (G, A, D, E, or M) are based on the class (isotype) of immunoglobulin produced by the myeloma cell. See "**Immunoglobulin (Ig)**."

Heavy chain deposition disease (HCDD): A rare type of monoclonal immunoglobulin deposition disease (MIDD) that is characterized by deposition of monoclonal heavy chains in organs. HCDD usually affects the kidneys but can also affect other organs.

Hematocrit (Hct): The percentage of red blood cells in the blood. A low hematocrit measurement indicates anemia.

Hematologic: Relating to the blood, originating in the blood, disseminated through the bloodstream.

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

Hematologist: A doctor who specializes in the problems of blood and bone marrow.

Hemoglobin: A protein in red blood cells that carries oxygen.

Herpes simplex: A common virus that causes sores, often seen around the mouth, commonly called "cold sores."

Herpes zoster: Also called "shingles," herpes zoster is caused by the reactivation of the varicella-zoster virus (VZV), the same virus that causes varicella (also called "chickenpox"). When reactivated, the herpes zoster infection frequently affects nerves.

High-risk multiple myeloma (HRMM): Myeloma that is more likely to relapse quickly after treatment or to be refractory to treatment, as defined by the cytogenetic (chromosomal) abnormalities t(4;14), t(14;16), t(14;20), del 17p, and 1q gain, along with Revised International Staging System (R-ISS) Stage III disease, and/or a high-risk gene expression profile (GEP) signature.

Hormones: Chemicals produced by various glands that regulate the actions of certain cells or organs in the body.

Human leukocyte antigen (HLA) test: A blood test used to match a blood, tissue, or organ donor to a recipient for transfusion or transplant.

Hydroxyapatite: A compound that helps form bones and gives them rigidity and strength.

Hypercalcemia: A higher than normal level of calcium in the blood. In myeloma patients, it usually results from bone breakdown with release of calcium from the bone into the bloodstream. This condition can cause a number of symptoms, including loss of appetite, nausea, thirst, fatigue, muscle weakness, restlessness, and confusion. See **“Calcium.”**

Hypersensitivity reaction: Undesirable reactions, sometimes in response to a medication, produced by the normal immune system, including allergies and autoimmunity. These reactions may be uncomfortable, damaging, or fatal.

Hypertension: A chronic medical condition in which the blood pressure in the arteries is elevated. Also known as high blood pressure.

Hyperviscosity syndrome (HVS): When blood becomes so thick that the reduced blood flow in smaller vessels causes complications, which can be life-threatening. Treatment and management include intravenous fluids and plasmapheresis.

Hypogammaglobulinemia: A laboratory diagnosis made when the immune system is not producing enough immunoglobulin G (IgG) in the blood.

Hyponatremia: A low level of sodium in the blood. Symptoms include nausea, headache, confusion, and fatigue. Hyponatremia can be caused by fluid loss through vomiting or diarrhea, and also by fluid overload from heart, liver, or kidney disease.

Hyposecretory: See **“Oligosecretory.”**

Hypoxia: A low level of oxygen in body tissues. Symptoms of hypoxia may include confusion, restlessness, difficulty breathing, rapid heart rate, and bluish skin.

Ikaros: A family of proteins that are highly expressed in myeloma and other B-cell cancers, where they are required for the growth and survival of cancer cells. Ikaros proteins are also important in the mechanism of action of immunomodulatory agents.

Immune effector cell-associated neurotoxicity syndrome (ICANS): A syndrome that can occur in the days or weeks after the administration of immunotherapy, especially immune effector cell (IEC) and T-cell therapies.

Immune system: A complex network of cells, tissues, organs, and the substances they make. The immune system helps the body defend itself by destroying infected and diseased cells and removing cellular debris, while protecting healthy cells.

Immunoassay: A test to detect proteins in the blood, it relies on the ability of an antibody to bind only to the specific three-dimensional structure of an antigen. In myeloma, this test is commonly used to detect specific antibodies.

Immunodeficiency: A lowering of the body's ability to fight off infection and disease.

Immunofixation electrophoresis (IFE): An immunologic test of the serum or urine used to identify proteins. For myeloma patients, it enables the doctor to identify the M-protein type (IgG, IgA, kappa, or lambda). The most sensitive routine immunostaining technique, it identifies the exact heavy- and light-chain type of M-protein.

Immunofluorescence: A test that directs fluorophores (fluorescent dyes) to specific targets within a cell in order to show the distribution of the target molecule in the test sample. In myeloma, immunofluorescence is typically performed to see the location of an antigen or an antibody on a myeloma cell.

Immunoglobulin (Ig): A protein produced by plasma cells; an essential part of the body's immune system. Immunoglobulins attach to foreign substances (antigens) and assist in destroying them. The classes (isotypes) of immunoglobulins are IgG, IgA, IgD, IgE, and IgM. Each type of immunoglobulin has a different function in the body. See "**Antibody**" and "**Antigen**."

- **IgG, IgA** – The two most common types of myeloma. The G and A refer to the immunoglobulin heavy chain produced by the myeloma cells.
- **IgD, IgE** – These types of myeloma occur less frequently.
- **IgM** – This is a rare type of myeloma. IgM myeloma is not the same as Waldenström macroglobulinemia.

Immunohistochemistry (IHC): Immunohistochemistry refers to the process of detecting antigens in cells of a tissue section by exploiting the principle of antibodies binding specifically to antigens. Immunohistochemical staining is widely used in the diagnosis of abnormal cells, such as those found in cancerous tumors.

Immunomodulatory agent: A drug that can modify, enhance, or suppress the functioning of the immune system. An immunomodulatory agent is sometimes called an “immunomodulatory drug (IMiD®).”

Immunosuppression: Weakening of the immune system that causes a lowered ability to fight infection and disease. Immunosuppression may occur both from the effect of myeloma on the immune system and from treatments for myeloma.

Immunotherapy: Treatment that enhances the body’s natural defenses to fight cancer.

Incidence: The number of new cases of a disease diagnosed each year.

Induction therapy: The initial treatment given to a patient in preparation for an autologous stem cell transplant (ASCT). See “**Frontline therapy**” and “**Line of therapy**.”

Inflammation: A protective response of the body against injury or disease.

Inflammatory: Relating to inflammation, a protective response of the body against injury or disease.

Informed consent: The process that requires a doctor to give a patient enough information about a procedure, strategy, or clinical trial – including the issues of risks, benefits, alternatives, and potential costs – for the patient to make an informed decision about whether or not to consent.

Infusion: Delivering fluids or medications into the bloodstream over a period of time.

Infusion pump: A device that delivers measured amounts of fluids or medications into the bloodstream over a period of time.

Infusion-related reaction (IRR): A type of hypersensitivity reaction that develops during or shortly after an intravenous (IV) infusion. IRRs are caused by cytokines and can occur with many IV cancer therapies. Reactions are often flu-like, and include nasal congestion, fever, chills, cough, throat irritation, shortness of breath, low blood pressure, nausea, and rash. See “**Administration-related reaction (ARR)**” and “**Cytokine**.”

Inhibit: To stop something or hold it in check.

Injection: The use of a syringe and needle to introduce a medication into the body.

Interferon: A naturally produced hormone (cytokine) released by the body in response to infection or disease that stimulates the growth of certain disease-fighting blood cells in the immune system. Interferon can be artificially produced by genetic engineering techniques and used as a form of immunotherapy.

Interleukin: A naturally produced chemical released by the body, or a substance used in biological therapy. Interleukins stimulate the growth and activities of certain kinds of white blood cells. Interleukin-2 (IL-2) is a type of biological response modifier that stimulates the growth of certain blood cells in the immune system that can fight some types of cancer. Interleukin-6 (IL-6) is a cytokine that is a potent stimulus to osteoclast and plasma cell growth.

Interventional radiology: The branch of radiology concerned with providing diagnosis and treatment of disease by a variety of procedures performed through the skin under the guidance of radiologic imaging.

Intravenous (IV) infusion: Administered into a vein.

Ischemic events: An event caused by an inadequate supply of blood to an organ or tissues, such as from an obstructed blood flow. Myocardial ischemia occurs when blood supply to the heart is reduced, preventing it from receiving enough oxygen. This can cause damage to the heart muscle.

K

Keratopathy: Any noninflammatory disease of the cornea, the eye's protective outer layer.

Kyphoplasty: A minimally invasive surgical procedure in which liquid cement is injected into a fractured or collapsed vertebra using a balloon technique. This can reduce pain and stabilize the spine.

See "**Vertebral compression fracture (VCF)**."

Kyphosis: An exaggeration of the normal curve of the spine.

L

Lactate dehydrogenase (LDH): An energy-producing enzyme that is present in almost all of the tissues in the body. LDH levels in the bloodstream rise in response to cell damage. LDH may be used to monitor myeloma activity.

Lesion: An area of abnormal tissue; a lump or abscess that may be caused by injury or disease, such as cancer. In myeloma, "lesion" can refer to a plasmacytoma or a hole in the bone.

- **Diffuse lesion** – A spread-out pattern of myeloma bone marrow involvement in an area of bone.
- **Focal lesion** – An abnormal area seen in the bone marrow on MRI or PET-CT study. In order to be considered a "myeloma-defining event," there must be more than 1 focal lesion of at least 5mm in size.

- **Lytic lesion** – The damaged area of a bone that appears as a dark spot on an X-ray when at least 30% of the healthy bone in any one area is eaten away. Lytic lesions look like holes in the bone and are evidence that the bone is being weakened. See “**Lytic (lysis).**”

Leukapheresis: See “**Apheresis.**”

Leukocytes: Cells that help the body fight infections and other diseases. Also called white blood cells (WBCs).

Leukopenia: A low number of white blood cells.

Light chain: An immunoglobulin light chain is the smaller of two units of an antibody. The light chains are bound by chemical bonds to the ends of the heavy chains, but we make extra light chains that enter the bloodstream. These are called “free light chains.” There are two types of light chains: kappa and lambda.

Light chain deposition disease (LCDD): A rare type of monoclonal immunoglobulin deposition disease (MIDD) that is characterized by deposition of complete or partial monoclonal light chains in organs. LCDD usually affects the kidneys but can also affect other organs. The goal of treating LCDD is to slow damage to organs.

Light chain escape: An increase of free light chains at the time of relapse without corresponding increase of the intact monoclonal immunoglobulin.

Line of therapy: A term used to calculate the number of therapies a patient has received. A line of therapy is 1 or more complete cycles of a regimen that can consist of a single agent, a combination of several drugs, or a planned sequential therapy of various regimens. Also see “**Induction therapy.**”

Lumbar vertebrae: The five lumbar vertebrae bones form the spine in the lower back, between the rib cage and the pelvis.

Lupus: See “**Systemic lupus erythematosus (SLE).**”

Lymphatic system: Also called “lymphoid system,” is a subsystem of the circulatory system that includes our lymph nodes and the channels that connect them. One of its main functions is the production and circulation of immune cells (e.g., lymphocytes, monocytes, and plasma cells). Lymphoid organs include the bone marrow and the thymus.

Lymphocytes: B cells (B lymphocytes), T cells (T lymphocytes), and natural killer (NK) cells that together constitute 30% of white blood cells (WBC).

Lymphopenia: Also called “lymphocytopenia,” this is a low level of B cells (B lymphocytes), T cells (T lymphocytes), and natural killer (NK) cells.

Lytic (lysis): Dissolution or destruction of cells or tissues.

M

M-spike: A monoclonal spike, the sharp pattern that occurs on protein electrophoresis tests, is a marker for the activity of myeloma cells. See “**Monoclonal**” and “**Monoclonal protein**.”

Macrophage: An immune system cell whose job it is to engulf and devour any cell (including a cancer cell) that does not have proteins on its surface that identify it as a healthy body cell.

Magnetic resonance imaging (MRI): Diagnostic imaging that uses magnetic fields and radio waves to produce detailed 2D or 3D images of structures inside the body. MRI can reveal the presence and distribution of myeloma in the bone marrow when X-rays show no damage. MRI can reveal myeloma outside of bone. MRI gives fine resolution of soft tissues, especially encroachments on the spinal cord.

Maintenance therapy: Drug or drugs given to patients to prolong remission.

Malignant: Cancerous; capable of invading nearby tissue and spreading to other parts of the body.

Maximum-tolerated dose (MTD): The highest dose of a drug or treatment that does not cause unacceptable side effects.

Mechanism of action (MOA): In medicine, this is the biochemical interaction or process through which a substance (e.g., drug or molecule) induces its effect in the body.

Median: The mean (middle) of two central numbers in a series of numbers. For example, “median progression-free survival (mPFS)” means that half the patients had remissions that were shorter and half the patients had remissions that were longer than the mPFS.

Melanoma: A cancer of the pigment-forming cells of the skin or the retina of the eye. Not associated with myeloma despite the similar-sounding name.

Meta-analysis: An analysis that combines, or pools, the data from multiple scientific studies.

Metabolism: The conversion of one compound into another compound, which occurs during a living organism’s life-sustaining chemical processes. See “**Metabolite**.”

Metabolite: Any substance that is formed during metabolism or that is necessary for metabolism. See “**Metabolism.**”

Metabolize: When the body or an organ of the body converts one compound into another by the process of metabolism. See “**Metabolism.**”

Metastasis: The spread of cancer cells from one part of the body to another. The term usually refers to solid tumors and not to myeloma, which is a blood-related cancer.

Minimal residual disease (MRD): The presence of residual tumor cells after treatment has been completed and complete response (CR) has been attained. Even patients who have attained a stringent CR (sCR) may have MRD. Highly sensitive testing methods are able to detect 1 myeloma cell among 1,000,000 sampled cells in blood or bone marrow. See “**MRD-negative.**”

Mobilizing agent: An agent injected into a patient or donor to trigger the release of bone marrow stem cells into the bloodstream.

Molecule: The smallest particle that retains all the properties of the substance. A molecule is an electrically neutral group composed of two or more atoms held together by chemical bonds.

Monoclonal: A monoclonal is a duplicate derived from a single cell. Myeloma cells are monoclonal, derived from a single malignant plasma cell in the bone marrow. The type of myeloma protein produced is also monoclonal, a single form rather than many forms (polyclonal). The important practical aspect of a monoclonal protein is that it shows up as a sharp spike on the protein electrophoresis test. See “**M-spike.**”

Monoclonal antibody: An antibody manufactured in a lab rather than produced in the human body. Monoclonal antibodies are specifically designed to find and bind to cancer cells and/or immune system cells for diagnostic or treatment purposes. Monoclonal antibodies can be used alone, or they can be used to deliver drugs, toxins, or radioactive material directly to tumor cells.

Monoclonal gammopathy of undetermined significance (MGUS): A plasma cell disorder characterized by comparatively low levels of monoclonal protein in the blood and/or urine. Bone marrow plasma cell levels are less than 10%. SLiM-CRAB criteria features are absent. See “**SLiM-CRAB criteria.**”

Monoclonal immunoglobulin deposition disease (MIDD): Caused by deposition of heavy chains, light chains, or both heavy and light chains. See “**Light chain deposition disease (LCDD)**” and “**Heavy chain deposition disease (HCDD).**”

Monoclonal protein (myeloma protein, M-protein): An abnormal protein produced by myeloma cells that accumulates in and damages bone and bone marrow. It is found in unusually large amounts in the blood and/or urine of myeloma patients. See “**Monoclonal**” and “**M-spike.**”

Monocyte: A type of white blood cell found in the circulation. Also called a macrophage when present in tissues.

Monotherapy: Therapy that uses a single drug to treat a disease or condition. This term also describes a single type of treatment used, such as surgery alone or radiation therapy alone.

MRD-negative: Minimal residual disease-negative. Depending on the test, not even one myeloma cell found in 100,000 or 1,000,000 sampled bone marrow plasma cells. See “**Minimal residual disease (MRD).**”

Multi-drug resistance (MDR): A resistance to treatment caused by a buildup of P-glycoprotein in the outer cell membrane of the myeloma cells.

Multiple myeloma: A cancer of the bone marrow plasma cells, white blood cells that make antibodies. Cancerous plasma cells are called myeloma cells.

Myelin sheath: A protective membrane that forms around nerve fibers, then speeds the transmission of electrical impulses efficiently along the nerve cells.

Myeloablation: A severe form of myelosuppression, in which the consequence of high-dose chemotherapy or radiation is the complete or near-complete destruction of the bone marrow’s ability to produce blood cells. See “**Myelosuppression.**”

Myelodysplastic syndrome (MDS): A condition in which the bone marrow does not function normally and does not produce enough blood cells. This condition can occasionally progress and become acute leukemia.

Myeloid: Referring to myelocytes, a type of white blood cell. Also called myelogenous. Myeloma is a lymphoid cancer, not a myeloid cancer.

Myeloma-defining event (MDE): The diagnosis of myeloma requires evidence of one or more MDE, such as CRAB criteria, 60% or more clonal plasma cells in the bone marrow, serum involved/uninvolved free light chain (FLC) ratio that is equal or greater than 100, or more than 1 focal lesion on magnetic resonance imaging. Also see “**CRAB criteria.**”

Myelosuppression: A decrease in the production of red blood cells, platelets, and some of the white blood cells.

Natural killer (NK) cell: NK cells, also known as large granular lymphocytes, are a type of white blood cell. They are responsible for tumor surveillance; able to recognize cells that have been transformed by tumors and to induce a strong response against tumors through the release of cytokines. Unlike cytotoxic T cells, NK cells can do this without the need of a “trigger” antigen on the tumor. This can result in a faster defensive response. In patients with active myeloma, NK cells are reduced both in number and in function.

Necrosis: The death of living tissues.

Neoplasia: Abnormal new growth of cells; cancer.

Neoplasm: Abnormal new growth of tissue or cells creating a malignant tumor.

Nephrotic syndrome: A group of diseases characterized by excretion of large amounts of protein (mostly albumin) into urine. Nephrotic syndrome frequently produces edema.

Nephrotoxicity: The quality of being toxic or destructive to kidney cells.

Neuropathy: A feeling of numbness, tingling, burning, and/or pain caused by nerve damage. See “**Peripheral neuropathy.**”

Neurosurgeon: A doctor who performs surgery on any part of the nervous system, including the back and the spinal cord.

Neurotoxicity: Neurologic toxicity is when exposure to toxic substances changes the normal activity of the nervous system.

Neutropenia: A reduced level of neutrophils, a type of white blood cell necessary to combat bacterial infection. Having too few neutrophils can lead to infection. Fever is the most common sign of neutropenia. If you have a fever, you must get immediate medical attention.

Neutrophil: A type of white blood cell necessary to combat bacterial infection. See “**Neutropenia.**”

Non-secretory myeloma: Approximately 98% of myeloma patients have measurable M-protein at the time of diagnosis (M-spike $\geq 1\text{gm/dL}$ in the serum, serum FLC $>10\text{mg/dL}$ and/or $\geq 200\text{ mg/day}$ in the urine). Only approximately 1%–2% of patients have true non-secretory myeloma with no evidence of M-protein as determined by serum protein electrophoresis (SPEP), serum immunofixation (SIFE), serum FLC, and urine protein electrophoresis (UPEP). Treatment options are the same regardless of M-protein amount, but patients with non-secretory myeloma may not be eligible for clinical trials that require measurable M-protein. Most

non-secretory patients are successfully monitored using bone marrow aspirate/biopsy and/or PET-CT imaging. See “**Monoclonal protein (myeloma protein, M-protein).**”

Nonsteroidal anti-inflammatory drug (NSAID): A drug used to reduce fever, swelling, and pain.

Nucleus: In advanced organisms, the nucleus of the cell is the control center of the cell. It stores all the genetic material (DNA) of the cell and it coordinates the cell’s activities, including growth and reproduction (cell division).



Oligosecretory myeloma: Disease with low amounts of measurable M-protein, also known as “hyPOSEcretory.” Patients with oligosecretory myeloma may require disease monitoring found effective for non-secretory patients. See “**Non-secretory myeloma.**”

Oncogene: A gene or DNA sequence that normally directs cell growth, but which can also promote or allow the uncontrolled growth of cancer if it is damaged (mutated) by environmental exposure to carcinogens, or if the oncogene is damaged or missing because of an inherited defect. An oncogene has the potential to cause a normal cell to become cancerous.

Oncologist: A doctor who specializes in treating cancer. Some oncologists specialize in a particular type of cancer.

Orphan drug: The orphan drug designation is granted by the U.S. Food and Drug Administration (FDA) to provide incentives such as tax credits, user fee waivers, and eligibility for orphan drug exclusivity to assist and encourage the development of drugs for rare diseases.

Orthopedic surgeon: Orthopedic surgeons use both surgical and nonsurgical means to treat musculoskeletal trauma, sports injuries, degenerative diseases, infections, tumors, and congenital disorders.

Orthostatic hypotension: Feeling dizzy or light-headed when blood pressure drops after suddenly standing up from a lying or sitting position. Can lead to fainting.

Osteoblast: A bone cell associated with production of bone tissue. Osteoblasts produce osteoid, which then becomes mineralized with calcium to form new hard bone.

Osteoclast: A cell found at the junction between the bone marrow and the bone. It is responsible for breaking down or remodeling old bone tissue. In myeloma, the osteoclasts are overstimulated, while osteoblast activity is blocked. The combination of accelerated bone resorption and blocked new bone formation results in lytic lesions.

Osteoid: The protein produced by osteoblasts which becomes mineralized with calcium to form hard bones.

Osteonecrosis of the jaw (ONJ):

- ***A jaw problem observed in a small percentage of patients taking bisphosphonates*** – The condition can cause pain, swelling, and bone damage around the tooth sockets in the jaws. Bone necrosis, or death of bone, occurs and can lead to loosened teeth, sharp edges of exposed bone, bone spurs, and the breaking loose of small bone spicules or dead bone. It is defined as ≥ 3 months with non-healing exposed bone. Symptoms may not be obvious at first, or may include pain, swelling, numbness or a “heavy jaw” feeling, or loosening of a tooth.
- ***A jaw problem observed in a small percentage of patients taking bone-modifying agents (BMAs)*** – ONJ can cause pain, swelling, jaw numbness or “heaviness,” and bone damage around the tooth sockets in the jaws. Bone necrosis (death) can lead to loose teeth, sharp edges of exposed bone, bone spurs, and the breaking loose of small bone spicules. ONJ is defined as 3 or more months with non-healing exposed bone.

Osteopenia: A condition in which bone mineral density is lower than normal, but not low enough to be classified as osteoporosis.

Osteoporosis: A progressive bone disease that is characterized by a decrease in bone mass and density, leading to an increased risk of fracture. Diffuse involvement of bones with myeloma produces what looks like osteoporosis on X-ray and bone density measurement.

Over-the-counter (OTC) medication: OTC products can be purchased without a prescription.

Overall response rate (ORR): In myeloma clinical trials, the percentage of patients whose monoclonal protein decreased by at least 50% in response to treatment.

Overall survival (OS): The median number of individuals in a group who are alive after a particular duration of time. OS is often used as a measure of treatment efficacy in clinical trials. The lengthening duration of OS in myeloma trials makes it a difficult endpoint to use, leading to the effort to validate minimal residual disease (MRD) status as a new endpoint.

Palliative treatment: A treatment designed to improve the quality of life by relieving pain and symptoms of disease but not intended to alter the course of the disease.

Paracrine: In a paracrine loop, factors produced by the microenvironment surrounding myeloma cells can stimulate these cells, which in turn stimulate the microenvironmental cells. Also see “**Autocrine.**”

Partial response: See “**Response or remission.**”

Pathogen: An infectious agent such as a virus, bacterium, prion, fungus, viroid, or parasite that causes disease in its host.

Pathologic fracture: A break in a bone usually caused by cancer or some disease condition. Occurs in myeloma-weakened bones, which can't bear normal weight or stress.

Pathologist: A doctor who specializes in pathology, the study of disease by the examination of tissues and body fluids under the microscope.

Performance status: Also called ECOG status. A measure of the level of activity of which a patient is capable and, by implication, a measure of the severity of disease. The ECOG scale runs from 0 (fully active and able to carry on all pre-disease activities without restriction) and to 5 (death). Many clinical trials require ECOG status of 0 or 1; studies enrolling patients with a status of 3 or 4 are rare.

Peripheral blood stem cells (PBSC): Stem cells collected from the circulating blood. These cells are similar to stem cells found in the bone marrow. The term “peripheral” means that the cells come from blood outside of the marrow.

Peripheral blood stem cell transplant: See “**Transplant.**”

Peripheral neuropathy (PN): Peripheral neuropathy is a serious condition that affects nerves in the hands, feet, lower legs, and/or arms. Patients may experience PN from the effects of the myeloma itself and/or from treatments for myeloma. Symptoms may include a feeling of numbness, tingling, burning, and/or pain.

PET scan: See “**Positron emission tomography.**”

Pharmacodynamics (PD): The study of the biochemical, physiologic, and molecular effects of a drug on the organism.

Pharmacogenomics (PG): The study of how genes affect response to a drug or treatment. Also called “pharmacogenetics.”

Pharmacokinetics (PK): The study of the processes by which a drug is absorbed, distributed, metabolized, and eliminated by the body.

Phlebitis: Inflammation of a vein.

Photophobia: When an extreme sensitivity to light is a symptom of another problem.

Placebo: An inert (inactive) substance often used in clinical trials for comparison with an experimental drug. No clinical trial for cancer patients in the U.S. can ethically or legally randomize patients to receive a placebo alone when they require treatment. In the placebo arm of a cancer treatment trial, patients receive treatment with approved therapy *plus* a placebo.

Plasma: The liquid part of the blood in which red blood cells, white blood cells, and platelets are suspended.

Plasma cells: White blood cells that produce antibodies. Myeloma cells are cancerous plasma cells, which produce monoclonal protein (myeloma protein, M-protein) that can lead to organ and tissue damage (anemia, kidney damage, bone disease, and nerve damage).

Plasma cell dyscrasias (PCDs): A type of blood cancer in which plasma cells become malignant and infiltrate the bone marrow. PCDs can be clinically indolent or aggressive. PCDs include multiple myeloma.

Plasmacytoma: See “**Extramedullary plasmacytoma**” and “**Solitary plasmacytoma of bone (SPB)**.”

Plasmapheresis: The process of removing certain proteins from the blood. Plasmapheresis can be used to remove high levels of M-protein from the blood of myeloma patients.

Platelets: One of the three major types of blood cells, the others being red blood cells and white blood cells. Platelets plug up breaks in the blood vessel walls and release substances that stimulate blood clot formation. Platelets are the major defense against bleeding. Also called thrombocytes.

Port (implanted): A catheter connected to a disc that is surgically placed just below the skin in the chest or abdomen so that fluids, drugs, or blood products can be infused, and blood can be drawn through a needle that is inserted into the disc.

Positron emission tomography (PET): A sophisticated diagnostic test that uses a camera and computer to produce images of the body. PET scans show the difference between healthy and abnormally functioning tissues based upon the uptake of radiolabeled sugar by active cancer cells.

Precancerous: A term used to describe a condition that may or may not become cancer. See “**Monoclonal gammopathy of undetermined significance**.”

Prognosis: The projected outcome or course of a disease; the chance of recovery; life expectancy.

Progression-free survival (PFS): The length of time during and after the treatment of myeloma that a patient lives with the disease but the myeloma does not get worse. In a clinical trial, PFS is one way to measure how well the treatment is working. See “**Progressive disease.**”

Progressive disease: Myeloma that is becoming worse or relapsing, as documented by tests. Defined as an increase of $\geq 25\%$ from the lowest confirmed response value in the myeloma protein level and/or new evidence of disease.

Proteasome: A joined group (“complex”) of enzymes (“proteases”) that break down the damaged or unwanted proteins in both normal cells and cancer cells into smaller components. Proteasomes also carry out the regulated breakdown of undamaged proteins in the cell, a process that is necessary for the control of many critical cellular functions. These smaller protein components are then used to create new proteins required by the cell. This is important for maintaining balance within the cell and for regulating cell growth.

Proteasome inhibitor: Any drug that interferes with the normal function of the proteasome. See “**Proteasome.**”

Proteins: Substances composed of amino acids. Proteins are an essential part of all living organisms, especially as structural components of body tissues such as muscle, hair, collagen, etc., as well as enzymes and antibodies.

Protocol: A detailed treatment plan, which includes the dose and schedule of any drugs used.

Pulmonary embolism (PE): A potentially life-threatening condition that occurs when a blood clot in a vein (deep vein thrombosis, or DVT) breaks loose, travels through the bloodstream, and gets stuck in an artery in a lung, blocking blood flow.

R

Radiation therapy: Treatment with X-rays, gamma rays, or electrons to damage or kill malignant cells. Radiation may be delivered from outside the body or from radioactive materials implanted directly in the tumor.

Radiologist: A medical doctor who specializes in interpreting images produced with X-rays, sound waves, magnetic fields, or other types of energy.

Recurrence: The reappearance of a disease after a period of remission.

Red blood cells (RBC): Also called erythrocytes, these cells in the blood contain hemoglobin, deliver oxygen to all parts of the body, and take away carbon dioxide. Red blood cell production is stimulated by a hormone (erythropoietin) produced by the kidneys. Myeloma patients with damaged kidneys don't produce enough erythropoietin and can become anemic. Myeloma patients can also become anemic because of myeloma cells' effect on the ability of bone marrow to make new red blood cells.

Refractory: Disease that is no longer responsive to standard treatments. Myeloma is refractory in patients who have had progressive disease either during treatment or within 60 days following treatment. Most clinical trials for advanced disease are for patients with relapsed and/or refractory myeloma.

Registration trial: A well-controlled clinical trial intended to provide the substantial evidence of safety and efficacy required by a governmental regulatory agency as a prerequisite to approval and sale of a product. The U.S. Food and Drug Administration (FDA) is the regulatory agency for drugs sold in America. The European Medicines Agency (EMA) is the regulatory agency for drugs sold in the European Union.

Regression: The shrinkage in size of a cancer or tumor.

Relapse: The reappearance of signs and symptoms of myeloma after a period of improvement. Patients with relapsed disease have been treated, then developed signs and symptoms of myeloma at least 60 days after treatment ended. Most clinical trials for advanced myeloma are for patients with relapsed and/or refractory disease.

Research Study: See "**Clinical Trial.**"

Response or remission: Interchangeable terms to describe the complete or partial disappearance of the signs and symptoms of cancer.

- **Stringent complete response (sCR)** – sCR is CR (as defined below) plus normal FLC ratio and absence of clonal cells in bone marrow by immunohistochemistry or immunofluorescence.
- **Complete response (CR)** – For myeloma, CR is negative immunofixation on serum (blood) and urine, and disappearance of any soft tissue plasmacytomas, and $\leq 5\%$ plasma cells in bone marrow. CR is not the same as a cure.
- **Very good partial response (VGPR)** – VGPR is less than CR. VGPR is serum M-protein and urine M-protein detectable by immunofixation but not on electrophoresis, or 90% or greater reduction in serum M-protein, plus urine M-protein less than 100 mg per 24 hours.
- **Partial response (PR)** – PR is a level of response in which there is at least a 50% reduction in M-protein, and reduction in 24-hour urinary M-protein by at least 90% (or to less than 200 mg per 24 hours).

Ribonucleic acid (RNA): Any of various nucleic acids that are associated with the control of cellular chemical activities. RNA is one of the two nucleic acids found in all cells – the other is DNA (deoxyribonucleic acid). RNA transfers genetic information from DNA to proteins produced by the cell.

Risk Evaluation and Mitigation Strategy (REMS): The U.S. Food and Drug Administration (FDA) requires a REMS program if a specific drug or treatment has serious safety concerns. REMS programs support the use of such drugs or treatments and help ensure that the potential benefits outweigh the risks.

S

Sacrum: A triangular-shaped bone located below the lumbar spine and above the coccyx (tailbone). The sacral region is comprised of five fused vertebrae (S1-S5) that form a wedge between the hip bones.

Safety population: A set of patients in a clinical trial who are grouped for analysis according to the treatment they received. Analysis includes safety and adverse events, toxicity and laboratory evaluations.

Salvage therapy: A treatment regimen that is given after the patient's disease does not respond to preferred therapies or the patient cannot tolerate other available therapies.

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

Second primary malignancy (SPM): A new cancer that is unrelated to a pre-existing cancer diagnosis. Secondary cancers that are a consequence of treatment for the initial cancer may occur months or years after the initial treatment.

Sepsis: The body's potentially life-threatening response to an infection. Sepsis occurs when bacteria, viruses, fungi, or other infectious organisms or toxins, which are created by infectious organisms in the bloodstream, spread throughout the body. Sepsis can lead to tissue damage, organ failure, and death. Sepsis can progress to septic shock, which is more likely to cause death than sepsis.

Selective inhibitor of nuclear export (SINE): A compound that prevents cells from expelling tumor suppressor proteins, which help protect the cell from cancer. When tumor suppressors accumulate in a myeloma cell, they can counteract the pathways that allow cancer cells to grow and divide, which leads to myeloma cell death. Also known as XPO1 inhibitors.

Serum: The colorless, liquid part of blood in which the blood cells are suspended.

Serum osteocalcin: A protein produced and secreted by osteoblasts when they are making osteoid. A low level reflects active myeloma. A higher-than-normal level reflects more stable myeloma.

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

Shingles: See “**Herpes zoster.**”

Side effect: An unwanted or unexpected effect caused by a drug. Also known as adverse reaction or adverse event (AE).

Skeletal-related event (SRE): Bone damage or fracture.

Skeletal survey (metastatic survey): A series of plain X-rays of the skull, spine, ribs, pelvis, and long bones to look for lytic lesions and/or osteoporosis.

SLiM-CRAB criteria: This acronym outlines myeloma-defining events (MDE) where patients have 10% or more plasma cells, plus one of the following features:

- **S** – Sixty percent (60%) plasma cells,
- **Li** – Light chains involved:uninvolved ratio of 100 or more,
- **M** – MRI imaging of more than 1 focal lesion in bone marrow,
- **C** – Calcium elevation due to myeloma,
- **R** – Renal (kidney) insufficiency due to myeloma,
- **A** – Anemia (low red blood cell count) due to myeloma,
- **B** – Bone disease attributable to myeloma.

Smoldering multiple myeloma (SMM): SMM is a higher level of disease than monoclonal gammopathy of undetermined significance (MGUS). Patients with SMM have 10% or greater clonal plasma cells in the bone marrow but do not have SLiM-CRAB criteria features. Patients with SMM should be seen at regular intervals by a hematologist/oncologist, preferably by a myeloma specialist. Standard-risk SMM does not require treatment, but patients with high-risk SMM should discuss with their doctor if treatment would be beneficial. See “**SLiM-CRAB criteria.**”

Solid tumor cancer: A malignant mass of tissue that does not contain cysts or liquid areas. Myeloma is a hematologic (blood-related) cancer, not a solid tumor cancer.

Solitary plasmacytoma of bone (SPB): A discrete, single mass of monoclonal plasma cells in a bone. The diagnosis of SPB requires a solitary bone lesion, a biopsy of which shows infiltration by plasma cells; negative imaging results for other bone lesions; absence of clonal plasma cells in a random sample of bone marrow; and no evidence of anemia, hypercalcemia, or renal involvement suggesting systemic myeloma.

Spinal cord: A long, thin, tubular bundle of nervous tissue and support cells that extends from the brain. The brain and spinal cord together make up the central nervous system. The spinal cord begins at the occipital bone and extends down to the space between the first and second lumbar vertebrae.

Spine: The spine, a collection of bones that make up the neck and back, is divided into four main regions: The cervical spine (neck region) is comprised of 7 vertebrae (C1 through C7, top to bottom). The thoracic spine (chest region) is comprised of 12 vertebrae (T1 through T12). The lumbar spine (lower back) is comprised of 5 vertebrae (L1 through L5). The sacrum is a triangular-shaped bone located below the lumbar spine and above the coccyx (tailbone).

Stable disease: Response to treatment that does not meet criteria for CR, VGPR, PR, or progressive disease. Myeloma can remain stable for many years. See “**Response**” and “**Progressive disease.**”

Stage: The extent of myeloma in the body.

Staging: Using exams and tests to learn the extent of myeloma in the body.

Stem cells (hematopoietic stem cells): The immature cells from which all blood cells develop. Normal stem cells give rise to normal blood components, including red cells, white cells, and platelets. Stem cells are normally located in the bone marrow and can be harvested for transplant.

Stem cell selection: A cell processing technology that is used to obtain a stem cell-enriched product and thereby reduce cancer cells in the transplant. Not used successfully for myeloma patients.

Steroid: A type of hormone. Steroidal hormones are produced by the body. Synthetic analogues (equivalents) of some steroids can be manufactured in a laboratory. Dexamethasone, prednisone, and methylprednisolone are synthetic steroids that have multiple effects and are used for many conditions, including myeloma.

Subcutaneous (SQ) injection: A method of administering medication under the skin by a short needle that injects a drug into the tissue layer between skin and muscle.

Substrate: A molecule upon which an enzyme acts.

Supportive care: Treatment given to prevent, control, or relieve complications and side effects and to improve the patient's comfort and quality of life.

Synergistic: When two or more elements produce a combined effect that is greater than the sum of their separate effects.

Syngeneic transplant: See "**Transplant (transplantation).**"

Systemic lupus erythematosus (SLE): The most common type of lupus, an inflammatory autoimmune disorder in which the immune system attacks and damages its own tissues and organs. Lupus can affect the joints, skin, kidneys, brain, heart, lungs, and blood cells. There is no cure for SLE, but medical care and lifestyle changes can help manage it.

Systemic treatment: Treatment using substances that travel through the bloodstream to reach and affect cells in the entire body.

T

T cell (T lymphocyte): A type of white blood cell that plays a central role in the immune system. T cells can be distinguished from other lymphocytes, such as B cells and natural killer (NK) cells, by the presence of a T-cell receptor (TCR) on the cell surface. They are called T cells because they mature in the thymus, although some also mature in the tonsils.

Tachycardia: A heart rate that is more than 100 beats a minute. Tachycardia may not cause any symptoms and may not be a concern, such as during exercise or as a response to stress. But some forms of tachycardia can lead to serious problems if left untreated, including heart failure, stroke, or sudden cardiac death.

Thrombocytes: See "**Platelets.**"

Thrombocytopenia: A low number of platelets in the blood. Platelets help blood to clot; fewer platelets can lead to easier bruising, bleeding, and slower healing. The "normal" level of platelets varies from laboratory to laboratory. For example, at Mayo Clinic the "normal" level is 150,000 or more platelets per microliter of circulating blood. Bleeding problems could occur if the count is less than 50,000 platelets. Major bleeding is usually associated with a reduction to less than 10,000 platelets.

Time-to-progression (TTP): The time from start of treatment until relapse occurs.

Toxin: A poisonous substance produced by or derived from plant, animal, or microorganism origin (i.e., bacteria, fungi, algae).

Trabecular bone: Also known as cancellous bone; the light, porous bone enclosing numerous large spaces that give it a sponge-like appearance. Trabecular bone contains marrow and blood vessels.

Transfusion: The transfer of blood or blood products.

Transplant (transplantation): There are several different types of transplantation procedures to replace diseased bone marrow with healthy bone marrow.

- **Autologous stem cell transplant (ASCT)** – This is the type of transplant used most frequently in myeloma. ASCT is a procedure in which doctors remove healthy peripheral blood stem cells (PBSC) from the patient’s circulating blood. The collected stem cells are then frozen and stored for later use within days, weeks, or years. When the patient is ready to proceed with ASCT, myeloablative high-dose therapy (HDT) is administered to destroy myeloma cells in the bone marrow, but healthy blood cells are also destroyed. The patient’s frozen stem cells are then defrosted and returned to the patient, where these cells can produce new blood cells to replace cells destroyed by the HDT. ASCT can provide remission that is both long and deep.
- **Allogeneic (allograft) transplant** – This type of transplant uses stem cells or bone marrow harvested from a donor who has been determined to be a compatible match with a recipient by means of a human leukocyte antigen (HLA) test. The donor cells are infused into the patient after myeloablative HDT. The donor’s immune system cells recognize the recipient’s myeloma cells as foreign and attack them. Unfortunately, the donor cells also attack other tissues in the recipient’s body, causing graft-versus-host disease (GVHD), which may cause complications or may even be fatal.
- **Reduced-intensity conditioning (RIC) allogeneic transplant** – A type of an allogeneic transplant, sometimes called “mini-allo” for short. RIC transplant is a newer and, for myeloma, a safer technique than a “full” allogeneic (allograft) transplant because RIC transplant is non-myeloablative. RIC transplant is usually performed within 180 days after a standard ASCT.
- **Bone marrow transplant** – A type of an autologous transplant where stem cells are collected from a patient’s bone marrow, not from a patient’s circulating peripheral blood. Currently, bone marrow transplantation is used infrequently in myeloma because the ASCT procedure is preferred. But bone marrow transplantation may be considered if stem cells could not be collected from the peripheral blood.

- **Tandem transplant** – A term used to indicate two autologous transplants done in succession. Tandem transplants are usually planned with 3-month to 6-month intervals between transplants. Tandem transplantation has become less common in the United States in the era of effective novel therapies.
- **Syngeneic transplant** – A type of an allogeneic transplant where bone marrow or stem cells from one identical twin sibling (donor) are infused into the other identical twin (recipient).
- **Matched unrelated donor (MUD) transplant** – A type of an allogeneic transplant where stem cells are genetically matched to the patient but are not from a donor who is a family member. In myeloma, this type of transplant carries a high rate of GVHD and is therefore very rarely used.
- **Umbilical cord stem cell transplant** – A type of an allogeneic transplant where stem cells are harvested from multiple umbilical cords of newborns in order to obtain enough stem cells for an adult transplant. In myeloma, this type of transplant carries a high rate of GVHD and is therefore very rarely used.

Treatment emergent adverse event (TEAE): An event that emerges during treatment, having been absent before treatment, or an event that worsens relative to the pretreatment state.

Tumor: An abnormal mass of tissue that results from excessive cell division. In myeloma, a tumor is referred to as a plasmacytoma.

Tumor lysis syndrome (TLS): A disorder caused by the break-down products of dying cancer cells, which can overwhelm the kidneys and lead to kidney failure. TLS can occur when a patient responds very quickly and deeply to therapy. TLS is usually treated with allopurinol, a treatment for gout.

Tumor marker: A substance in blood or other body fluids that serves as a measure of cancer. In myeloma, the tumor marker is monoclonal protein found in the blood or urine.

Tumor necrosis factor (TNF): A cell signaling protein (cytokine) involved in systemic inflammation and bone resorption. TNF alpha (TNF- α) is elevated in myeloma patients.

Tumor suppressor gene: A gene that protects a cell from one step on the path to cancer. When this gene mutates to cause a loss or reduction in its function, the cell can progress to cancer, usually in combination with other genetic changes. See “**Anti-oncogene.**”

V

Vaccine: A preparation of killed microorganisms, living attenuated organisms, or living fully virulent organisms that is administered to produce or artificially increase immunity to a particular disease.

Vascular endothelial growth factor (VEGF): A growth factor that promotes the growth of new blood vessels (angiogenesis).

Venous thromboembolism (VTE): A condition that includes both deep vein thrombosis (DVT) and pulmonary embolism (PE). Risk factors include infection, age >75, cancer, and a history of VTE. See “**Deep vein thrombosis (DVT)**” and “**Pulmonary embolism (PE)**.”

Vertebra: Any one of the 33 bony segments of the spinal column. Plural noun is “vertebrae.”

Vertebral body: The round bony area of a vertebra.

Vertebral compression fracture (VCF): A complication that may occur in a patient with myeloma bone disease when a vertebra of the spinal column fractures or collapses because the bone is too weak to withstand the pressure placed upon it by a fall, twist, bump, cough, sneeze, or the force of gravity acting upon the skeleton.

Vertebroplasty: A minimally invasive surgical procedure in which liquid cement is injected into a fractured or collapsed vertebra to reduce pain and to stabilize the spine after a vertebral compression fracture (VCF).

Virus: A small living particle that can infect cells and change how the cells function. The disease and the symptoms caused by a viral infection vary based on the type of virus and the type of cells that are infected.

W

Waldenström macroglobulinemia (WM): A rare type of non-Hodgkin's lymphoma (NHL) that affects plasma cells. Excessive amounts of IgM protein are produced. WM is not a type of myeloma.

White blood cells (WBC): General term for a variety of leukocytes responsible for fighting invading germs, infections, and allergy-causing agents. These cells begin their development in bone marrow and then travel to other parts of the body. Specific white blood cells include neutrophils, basophils, eosinophils, lymphocytes, and monocytes.

X

X-ray: A form of electromagnetic radiation that can penetrate the human body. Used in low doses, X-rays produce images of structures and tissues inside the body that can reveal signs of disease or injury. In myeloma, a full skeletal survey using a series of X-rays is needed to show loss (osteoporosis) or thinning (osteopenia) of bone caused by myeloma bone destruction, lytic lesions, or any fracture or collapse of bone. X-rays show characteristic myeloma bone disease in a majority of patients, but X-rays are negative in approximately 25% of patients with active myeloma.

Selected acronyms and abbreviations

ADC: See “Antibody-drug conjugate (ADC)”

Allo, allogeneic: See “Transplant (transplantation)”

ASCT, Auto: See “Transplant (transplantation)”

β₂M, β₂M: See “Beta-2 microglobulin”

BCMA: See “B-cell maturation antigen (BCMA)”

CAR T: See “Chimeric antigen receptor (CAR) T-cell therapy”

CT or CAT: See “Computed axial tomography (CAT or CT)”

CBC: See “Complete blood count (CBC)”

CELMoD: See “Cereblon E3 ligase modulatory drug (CELMoD)”

CR: See “Response or remission”

CRP: See “C-reactive protein (CRP)”

CRS: See “Cytokine release syndrome (CRS)”

DLT: See “Dose-limiting toxicity”

DoR: See “Duration of response”

DpR: See “Depth of response”

DVT: See “Deep vein thrombosis (DVT)”

ECOG status: Eastern Cooperative Oncology Group status – see “Performance Status”

EMD: See “Extramedullary disease (EMD)”

FISH: See “Fluorescence in situ hybridization (FISH)”

FLC: See “Free light chain (FLC)”

GVHD: See “Transplant (transplantation)”

HDT: High-dose therapy – see “Transplant (transplantation)”

HR: High-risk – see “High-risk multiple myeloma (HRMM)”

IFE: See “Immunofixation electrophoresis (IFE)”

Ig: See “Immunoglobulin (Ig)”

ISS: International Staging System – see “Staging”

IV: See “Intravenous (IV)”

IVIG: Intravenous immunoglobulin

MGUS: See “Monoclonal gammopathy of undetermined significance”

MRD: See “Minimal residual disease (MRD)”

MRI: See “Magnetic resonance imaging (MRI)”

mSMART: Mayo Stratification of Myeloma and Risk-Adapted Therapy

MTD: See “Maximum-tolerated dose”

NA, N/A: Not applicable

NDMM: Newly diagnosed multiple myeloma

NGF: Next-generation flow cytometry test

NGS: Next-generation sequencing DNA test

NR: Not reached

ONJ: See “Osteonecrosis of the jaw (ONJ)”

ORR: See “Response or remission”

OS: See “Overall survival (OS)”

PCLI: Plasma cell labeling index

PCR: Polymerase chain reaction (test)

PET: See “Positron emission tomography (PET)”

PFS: See “Progression-free survival (PFS)”

PN: See “Peripheral neuropathy (PN)”

PR: See “Response or remission”

R-ISS: Revised International Staging System – see “Staging”

RRMM: Relapsed refractory multiple myeloma

RQPCR: Real-time quantitative polymerase chain reaction (DNA test)

sCR: See “Response or remission”

SD: Stable disease

SINE: See “Selective inhibitor of nuclear export (SINE)”

SMM: See “Smoldering multiple myeloma (SMM)”

SPM: See “Second primary malignancy (SPM)”

SQ: See “Subcutaneous (SQ) injection”

SRE: See “Skeletal-related event (SRE)”

TTP: See “Time-to-progression (TTP)”

VCF: See “Vertebral compression fracture (VCF)”

VEGF: See “Vascular endothelial growth factor (VEGF)”

VGPR: See “Response or remission”

Selected generic and brand names of FDA-approved drugs for myeloma

- Bortezomib (Velcade®)
- Carfilzomib (Kyprolis®)
- Ciltacabtagene autoleucel or “cilta-cel” for short (Carvykti®)
- Daratumumab or “dara” for short (Darzalex®)
- Denosumab (Xgeva®)
- Dexamethasone or “dex” for short
- Elotuzumab or “elo” for short (Empliciti®)
- Elranatamab-bcmm (Elrexfio™)
- Idecabtagene vicleucel or “ide-cel” for short (Abecma®)
- Isatuximab or “isa” for short (Sarclisa®)
- Ixazomib (Ninlaro®)
- Lenalidomide or “len” for short (Revlimid®)
- Pomalidomide or “pom” for short (Pomalyst®)
- Selinexor (Xpovio®)
- Talquetamab-tgvs (Talvey™)
- Teclistamab (Tecvayli®)
- Thalidomide or “thal” for short
- Zoledronic acid (Zometa®)

In closing

To help ensure effective treatment with good quality of life, you must play an active role in your own medical care. This booklet is not meant to replace the information provided by your doctors and nurses. The IMF intends only to support you in discussions with your healthcare team.

We encourage you to visit myeloma.org for more information about myeloma and to contact the [IMF InfoLine](https://myeloma.org) with your myeloma-related questions and concerns. The IMF InfoLine consistently provides the most up-to-date and accurate information about myeloma in a caring and compassionate manner. Contact the IMF InfoLine at 1.818.487.7455 or InfoLine@myeloma.org.



Connect. Be Informed. Take Charge.

INTERACTIVE RESOURCES AT A GLANCE

Use the hyperlinks and web addresses included in this publication for quick access to resources from the IMF.

infoline.myeloma.org



Contact the IMF InfoLine with your myeloma-related questions and concerns

videos.myeloma.org



The latest on myeloma research and clinical practice, as well as IMF webinars and other events

medications.myeloma.org



Learn about FDA-approved therapies for myeloma

support.myeloma.org



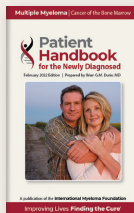
Robin Tuohy rtuohy@myeloma.org will help you find a multiple myeloma support group

diversity.myeloma.org



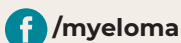
Diversity and inclusion are integral aspects of the myeloma community

publications.myeloma.org



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