Glossary of Cancer Related Terms

(Compiled 2012 by Sharon Stathis R.N. – Revised 17.03.2016)

Adenoma: A benign tumour of glandular origin (epithelial tissue) that can appear in varied locations such as the colon, pituitary gland, thyroid gland and breasts. In some cases they may develop into malignant tumours which then become known as adenocarcinomas.

Adjuvant & Neoadjuvant therapy: Treatment that is given in addition to the primary treatment.

> **Adjuvant** treatment (e.g. chemotherapy, radiotherapy, biotherapy, hormone therapy) is given **after** the primary treatment to destroy any undetected cancer.
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> **Neoadjuvan**t treatment (e.g. chemotherapy, radiotherapy, biotherapy, hormone therapy) is given **before** the primary treatment to help kill cancer cells, thereby contributing to the effectiveness of the primary therapy.

Aetiology: The cause or origin of a disease or condition.

Angiogenesis: A natural process whereby new blood vessel (capillary) growth occurs in the body. To avoid insufficient or excessive growth, the process is normally controlled by a balanced production of stimulating and inhibitory factors. Malignant tumours have the ability to produce growth factors that stimulate the vessels to grow into the tumour. Antiangiogenic drugs that interfere with this process are now administered for many forms of cancer.

Antineoplastic agents: Are used to destroy, prevent or inhibit the maturation and proliferation of cancer cells. They include commonly administered groups of chemotherapy drugs, hormones and antagonists, growth factors, monoclonal antibodies and vaccines.

Apoptosis: A normal physiological process described as programmed cell death or cell suicide. It is the process by which old, diseased and unnecessary cells are removed from the body to maintain health. Antineoplastic agents induce apoptosis in cancer cells by varied mechanisms.

Asthenia: General weakness, loss of strength and energy.

Biological therapy (also called biotherapy or immunotherapy): A systemic therapy using substances which directly or indirectly influence the body's immune system to treat cancer, or reduce the side effects of some cancer treatments. Biological therapies include growth factors, monoclonal antibodies, vaccines and gene therapy.

Blast cells (myeloblasts or myeloid blasts): Immature, partly differentiated human blood cells of the myeloid cell line that are normally located in the bone marrow. Blast cells have the potential to form into erythrocytes (red cells), granulocytes (white cells - monocytes, neutrophils, basophils, eosinophils) and platelets. An overproduction of abnormal myeloblasts may result in cancers such as Acute myeloid (or myelogenous) leukaemia (AML) and Myelodysplastic syndrome (MDS).

Bone Marrow Transplantation (BMT): The process that is used in BMT to obtain stem cells requires the withdrawal of whole marrow directly from bone. BMT has been almost superseded by peripheral stem cell transplantation. Both procedures share the same goal. The major difference is the source from which the stem cells are collected.

Cachexia: It is a systemic inflammatory syndrome that occurs when advanced cancer (or some other chronic disease) disrupts body metabolism. This results in loss of appetite, weight loss, weakness and muscular atrophy.

Cancer (malignancy): A collection of diseases caused by abnormal gene function and resulting in uncontrolled proliferation of abnormal cells in a part or parts of the body. The majority of cancers form one or more tumours. πBlood cancers such as leukaemia do not. Currently in excess of 200 forms of cancer (including sub-types) are listed. Cancers are broadly described as indolent (slow growing) or aggressive (quickly spreading and causing damage).

Cancer is usually named after the primary site in which it has developed. Mechanisms by which cancer develops, proliferates and responds to treatment can vary considerably due to the unique properties of each disease. This results in a varied and complex system of cancer classification.

Carcinogenesis: The processes by which healthy cells are transformed into cancer cells.

Carcinoma: Cancer that is derived from epithelial cells i.e. tissues that line or cover body organs (including skin). Commonly occurring cancers such as lung, breast, prostate and colorectal are carcinomas.

Carcinoma in situ: An early form of noninvasive cancer that is still present in its site of origin and has not spread to surrounding tissue.

CAT (Computerised Axial Tomography) or CT (Computed Tomography): Introduced in 1972, CAT scanning is a high resolution X-ray in which a computer generates cross-section views of a patient's anatomy. Sometimes contrast material is used in CAT scanning. CAT scans emit higher levels of radiation than traditional X-rays. It is said that a CT of the chest can be equivalent to having at least 100 chest X-rays.

Cell lysis: A process in which a cell is decomposed or destroyed due to the action of a specific agent.

Cell surface marker: A molecule found on the plasma membrane of a cell or group of cells which helps to distinguish and discriminate between different cell types.

Central venous catheter (CVC) or Central line: An intravenous line that is inserted into a large, major vein such as the jugular or subclavian. Central lines can remain in place for extended periods of time. Uses include the taking of blood samples and the delivery of fluids (including blood) and antineoplastic agents. CVCs reduce the need for venepuncture or cannulation. Potential problems with these lines are blockage from blood clotting and the risk of infection. After each use, central lines are flushed with saline and then locked with heparinised saline to prevent clotting. It is important that the insertion site is kept scrupulously clean, and any sign of infection reported and treated promptly. Types of central lines in common use include Hickman line, PICC line and Portacath.

> **Hickman line:** A venous catheter which is threaded (tunnelled) under the skin of the chest before entering a large central vein. It can be used as above and also for patients undergoing intensive treatment such as peripheral blood cell transplantation.
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> **Portacath:** An implantable venous access port which is surgically inserted just under the skin on the chest. The port is attached to a catheter which is inserted into a large central vein.
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> **PICC (peripherally inserted central catheter) line:** It is inserted into a large vein in the arm and then threaded into the subclavian vein.

Chemotherapy: Chemotherapy is a treatment that uses drugs to destroy, stop the spread of or retard the growth of cancer. A chemotherapeutic agent can be used alone (monotherapy) or combined with two or more agents (combination therapy). Treatment can be administered intermittently or continuously, and given via many routes including oral, intramuscular, intravenous and intrathecal (into the spine). Commonly used drugs are grouped as antimetabolites, alkylating agents, plant alkyloids and anti-tumour antibiotics.
(see also ‘cytotoxic drugs’)

Circulating tumour cells (CTCs): CTCs are tumour cells detected in the peripheral blood circulation after detaching from a primary tumour mass. They have the potential to form metastases. CTCs may display different characteristics to the cancer cells of the primary tumour. The detection and analysis of CTCs has the potential to facilitate accurate diagnosis, select the most appropriate treatment options, enable monitoring of progression of disease and help determine prognosis.

CUP (Cancer of unknown primary): Undefined metastatic cancer occurs when the type of cancer cells cannot be identified. Approximately 10% of cancer deaths in Australia during 2010 were attributed to CUP.

Cure: Refers to the end of a medical condition. All detectable cancer has completely disappeared and it will not return. (If a patient remain signs and symptoms free for a period of 5 years, cancer is less likely to return.)

Cytogenetics: The study of the structure and function of the cell with particular emphasis on chromosomes and chromosomal abnormalities.

Cytotoxic drugs: Drugs that inhibit the proliferation of cells within the body. This may be done by killing the cell or inhibiting cell division. Cytotoxic drugs are usually associated with chemotherapy for malignancies. However, some patients are now receiving cytotoxic drugs for non-oncologic diseases. The list of these drugs and their various combinations is extensive. Side effects are common and may be mild to severe. Safety precautions are well documented for manufacturing, administering and taking these drugs.

Differential diagnosis: A systematic process involving an evaluation of symptoms and signs and their causation to establish an accurate diagnosis of a disease or disorder. From a prioritised list of possible conditions a diagnosis is determined.

Differentiation: Describes the degree of abnormality of a cancer cell when compared to normal, healthy cells of the same tissue type. The cells of graded cancers are described as: **well differentiated** (low grade); **moderately differentiated** (intermediate grade); **poorly differentiated** or **undifferentiated** (high grade)

Disseminated cancer: A malignancy that has spread from its primary site i.e. metastasis

Dysplasia: The abnormal development of cells, tissues, organs or part of the body.

Epigenetics: A relatively new and rapidly growing research area involving heritable changes in gene function due to mechanisms that do not involve change in DNA sequence. These mechanisms are not yet fully understood. The possible links to cancer are associated with the initiation and/or progression of cancer. It is thought epigenetic change might precede genetic change and/or follow after it.

First, second or third-line treatment: First-line treatment refers to the initial treatment given for a specific cancer. Second-line refers to treatment that is given if first-line treatment has failed. Third-line treatment is given if both first and second-line have failed.

Gallium scan: An imaging technique that uses intravenously injected radioactive gallium to detect areas of infection, abscess and various types of tumour, particularly lymphoma.

Gamma globulin: A protein fraction of blood serum containing a wide variety of immunoglobulins (antibodies). Preparations of gamma globulin are derived from pooled human blood. Gamma globulin can be administered intravenously to cancer patients (and others) with immune deficiency.

Gene: A basic, biological unit of heredity, consisting of segments of DNA located at a specific location on a chromosome. Genes are capable of replication. They are responsible for the functions and reproduction of all cells in the body. Genetic mutations may be present at birth (inherited) or be acquired throughout life (sporadic or somatic). Some cancers are caused by inherited genomic aberrations but most are due to sporadic mutations. Oncogenes and tumour suppressor genes are two main types of genes that are involved with cancer development.

> **Proto-oncogenes** are involved in the regulation of cell differentiation, reproduction and apoptosis. When proto-oncogenes are altered by mutation, they become oncogenes.
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> **Oncogenes** are mutated forms of proto-oncogenes. Oncogenes are either permanently turned on or inappropriately activated. The result is uncontrolled cell growth which may contribute to the development of cancer.
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> **Tumour suppressor genes (antioncogenes)** are responsible for limiting cell proliferation. Mutations that alter normal tumour suppressor gene function result in uncontrolled cell growth which may lead to cancer.

Genotoxicity: The ability to cause genetic change or mutation.

Glycolysis: An oxygen independent metabolic process occurring in cells by which enzymes break down glucose. The energy released during this process is used to form high-energy compounds such as ATP. Most cancers utilise the process of anaerobic glycolysis to provide energy for growth and tumour proliferation.

Grading: Grading of cancer is used to determine the degree of abnormality of a cancer cell when compared to normal, healthy cells of the same tissue type, and how quickly the cancer is likely to grow and spread. Grading cancer is helpful in estimating a patient's prognosis and for developing treatment protocols. Generally, the lower numbers on a grading scale indicate a more slowly growing cancer. The higher numbers are associated with more aggressive cancer. Because different cancers behave in their own, unique way, they are assigned their own, unique grading system. Some commonly used grading systems include *Gleason, Bloom-Richardson* and *Fuhrman.*

> The **Gleason score** system for prostate cancer uses a scale of 1 to 10. Low grade (least aggressive) is represented by the low numbers. High grade would score 8 to10.
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> The **Bloom-Richardson** grades for breast cancer number from 1 to 3. In some countries this system has been modified and replaced by the more complex **Nottingham** grading system which scores from 3 to 9.
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> The **Fuhrman** system for kidney cancer scores from 1 to 4

Grading, as mentioned, is helpful in predicting prognosis and formulating treatment options. However, it does not stand alone. It needs to be considered alongside the 'staging' of cancer as described below.

Graft versus host disease (GVHD): A life-threatening side effect of allogeneic stem cell transplantation in which the donor's transplanted immune cells attack the cells of the recipient. The pathophysiology associated with GVHD is complex and still not fully understood. New prevention and treatment approaches are still being researched.

Growth factor: A protein molecule that has the ability to regulate cell growth and proliferation. Many unregulated growth factors are implicated in tumour formation. Growth factors are now being produced in the laboratory for use in biological therapy.

Hand-Foot Syndrome (HFS) or Palmar-plantar erythrodysesthesia (PPE): HFS is a condition associated with the administration of certain chemotherapy agents. The toxicity manifests on the palms of the hands and soles of the feet as redness, swelling, scaling, tingling or pain. In severe cases it may progress to blistering, ulceration and necrosis. The incidence of HSF varies with the type of drug, the dosage and the way in which it is administered. Early identification and treatment of HFS may reduce its severity and prevent unnecessary changes to the chemotherapy regime, thus optimising successful outcomes.

Histology: The microscopic study of cells and tissue that involves the identification of their structure, composition and function.

Iatrogenic disorder: A newly acquired, adverse physical, mental or emotional condition which is the direct result of service delivered by a health provider e.g. infection, drug interactions, surgical complications.

Idiopathic: A disease of unknown origin.

Immune deficiency (immunodeficiency): An impaired ability of the immune system to carry out its normal function. The two broad classifications of immunodeficiency are congenital and acquired. Congenital (primary) immunodeficiency is present at birth and results from a genetic defect. The more commonly occurring acquired immunodeficiency occurs later in life and is caused by malnutrition, infections, some diseases, and the side effects of drugs such as chemotherapy.

Immunoglobulin (Ig): A protein produced by plasma cells in response to the detection of foreign molecules in the body. Immunoglobulins are also referred to as antibodies. Classes of immunoglobulins include IgA, IgG, IgM, IgD and IgE. The most abundant of these is IgG. It is the only kind of antibody that can cross the placental barrier.

Immunotherapy (biological therapy, biotherapy): A systemic therapy utilising manufactured substances that use the body's immune system to combat cancer. It includes the use of monoclonal antibodies, vaccines and growth factors such as Interferons (IFN), Interleukins (IL) and Colony-stimulating factors (CSFs).

Indolent cancer: Slow to grow and progress.

Karyotype: The examination and classification of chromosomes with reference to number, shape, size, arrangement and other characteristics. Because cancer cells exhibit chromosomal aberrations, karyotyping can be a useful investigation to aid diagnosis.

Lactate Dehydrogenase (LDH): LDH is a protein normally found in the body in small amounts. Many cancers can raise LDH levels. It can be used as a tumour marker to monitor the progress of cancer, with or without treatment.

Leukaemia: A cancer of the blood forming cells in the bone marrow. Abnormal cells crowd the bone marrow and interfere with the production of normal, healthy cells. Leukaemia can occur in the white cells of the myeloid and lymphoid cell lines. Both major types, myeloid (myelogenous) leukaemia and lymphocytic (lymphoblastic) leukaemia present as either acute or chronic. In total there are more than a dozen types, including sub-types. The four main classifications of leukaemia are: Acute lymphocytic (ALL), Acute myeloid (AML), Chronic Lymphocytic (CLL), Chronic myeloid (CML). CLL is the most common form of leukaemia.

Lymphoma: Lymphomas are a large and diverse group of cancers of lymphocytes. There are two main categories of lymphoma - Hodgkin's lymphoma and non-Hodgkin's lymphoma (also referred to as B and T-cell lymphomas), with a variety of sub-types.

> **Hodgkin's lymphoma (or Hodgkin's Disease)** is usually diagnosed from lymph node biopsy. It is distinguished from other lymphomas by the microscopic presence of Reed-Sternberg cells. It commonly affects adolescents and young adults, but can affect people at any age. There are approximately five varieties of Hodgkin's Lymphoma**.** Treatment options will vary according to the type and stage of the lymphoma. A large percentage of patients respond well to treatment with radiotherapy and/or chemotherapy.
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> **non-Hodgkin's lymphoma (NHL)** Almost 90% of all lymphomas are NHL and there are approximately thirty varieties. They can roughly be divided into slow growing (low-grade) or fast growing (intermediate or high grade). Factors such as immunosuppression and certain viral infections sometimes predispose the development of NHL. There is a wide variety of treatment options available. Selection will vary according to the type and stage of the disease.

Metastasis (plural is **metastases):** The spread of a cancer from its primary site to another part or parts of the body. Spread occurs via blood and lymphatic fluids and by local invasion of nearby tissues. Common sites of cancer metastasis are lymph nodes, lungs, liver and bones.

Methylation: A highly complex intracellular process responsible for regulating vital chemical processes throughout the body. Amongst a long and impressive list of functions, methylation is responsible for repair and maintenance of DNA. Methylation regulates gene expression, especially cancer causing genes.

Monoclonal antibodies (MABs): Are genetically engineered antibodies used in the treatment of cancer. MABs act in a variety of ways. They can mark the cancer cells so they become visible to the immune system and are destroyed. This mechanism of action is particularly useful for B-cell lymphomas. Other MABs have the ability to block growth factor receptors on the surface of cells so they can't grow and multiply. Some MABs block growth factor signals that are involved with angiogenesis. MABs can be combined with radioactive particles to deliver low dose radiation to the cancer cells.

MRI (Magnetic Resonance Imaging): MRI is a diagnostic technique producing high quality images of structures within the body without the use of X rays or other radiation. The results are achieved with the use of strong radio waves within a powerful magnetic field. Unfortunately, it is extremely expensive, resulting in the less safe CAT and PET scans being more commonly used here in Australia.

Mutation: An abnormal change in a gene. There are two types - inherited or acquired (somatic).

Myelodysplastic disorders or Myelodysplastic syndrome (MDS): A group of diseases that are associated with an underproduction of healthy erythrocytes, granulocytes and platelets in the bone marrow. An overproduction of blast cells can crowd the bone marrow and interfere with the development of sufficient quantities of healthy cells. Risk factors for developing MDS include age of more than 60 years, and previous treatment with chemotherapy or radiation. Transformation to AML occurs in approximately one third of patients. Depending on the classification, MDS can be graded as indolent or aggressive.

Myeloma (also known as Multiple myeloma): A cancer involving the overproduction of abnormal plasma cells (myeloma cells). The large numbers of these cells that build up in the bone marrow can interfere with the sufficient production of normal, healthy blood cells. The myeloma cells can also damage the compact bony tissue.

Myeloproliferative disorders: Closely related diseases that are associated with the overproduction of abnormal blood cells or fibrous tissue in the bone marrow. The mutated cells are from the myeloid cell line (erythrocytes, granulocytes and platelets). Common disorders include Chronic myeloid (or myelogenous) leukaemia (CML), Polycythemia vera (PV), Essential thrombocythaemia (or thrombocytosis) and Idiopathic myelofibrosis. Some myeloproliferative disorders are not yet classified.

Neoplasm: see 'Tumour'.

Neutropenia: An abnormally low number of neutrophils in the blood circulation. It is associated with many blood cancers, and is a common side effect of chemotherapy. Neutropenia can be a by product of radiation therapy when it is directed at the bone marrow. Infection is the greatest risk to cancer patients with neutropenia.

Oncology: The study, diagnosis, treatment and prevention of cancer and cancer related diseases.

Palliative care: To improve the quality of life through treating the symptoms of cancer e.g. pain

Paraprotein: An abnormal protein (an antibody) produced by myeloma cells. The measurement of paraprotein is useful in diagnosing and monitoring the progress of myeloma.

Parenteral drug administration**:** It literally means non-oral methods of administration. Commonly used parenteral methods of drug administration include intravenous, intramuscular and subcutaneous routes. (Inracardiac, intraarterial and intraperitoneal would also come under the umbrella of parenteral.)

Pathogenesis: The complete course of a disease from its origin and initial manifestation, including all associated pathologic mechanisms.

Performance status: A scoring system which is used to ascertain the general health and well being of a cancer patient. There are several scoring systems which may involve different assessment criteria. The patient's ability to participate in daily life activities is always a major focus. Performance status is often included in selection criteria before cancer patients can enter clinical trials. It is also useful for monitoring disease progress and for determining appropriate treatment.

Peripheral Neuropathy: Refers to a range of disorders that involve damage to the peripheral nerves (sensory and motor). There are many causes, including chemotherapy. Symptoms may be temporary or long term, and include tingling, numbness, weakness and pain in the hands and feet.

Chemotherapy induced peripheral neuropathy (CIPN): The incidence of CIPN varies with the type of chemotherapy drugs being used. Those known to induce CIPN include vincristine, paclitaxel, oxaliplatin and cisplatin. Up to 60% of patients treated with these agents will develop some degree of CIPN. Approximately 20% of these recipients will manifest it in a chronic form.

PET (Positron Emission Tomography): Introduced in 2000, PET scans use computerised radiography to examine

the metabolic activity of various tissues. The patient is intravenously injected with a positron-emitting radioactive substance (radioisotope) which becomes localised in specific tissues. In the case of cancer, the tagged substance is usually a synthetic form of glucose (e.g. fluorodeoxyglucose) which, when taken up by aggressive malignant tissue, will emit detectable gamma rays.

Pheresis (apheresis): A process by which blood is withdrawn from an individual, a particular component is removed (such as stem cells), and the remaining blood is returned to the individual. Pheresis is used in the treatment of many serious illnesses, including cancer. There are many types of pheresis. Removed blood components include leukocytes (leukapheresis), erythrocytes (erythrocytapheresis), platelets (platletpheresis) and plasma (plasmapheresis).

Plasma cells: Activated, mature B-lymphocytes that produce antibodies in response to the entry of pathogens into the body.

Polymorphism: A commonly occurring variation in a part or parts of a particular DNA sequence of a species. Scientists are currently investigating the associations of genetic polymorphism and cancer risk. It is hoped this research will lead to more accurate methods of predicting cancer prognosis and how cancers might respond to various therapies.

Prognosis: An estimation of the probable course and outcome of a disease process.

Prognostic factors: Prognostic tools include the type of cancer, its size, location, grade and stage of the disease. Biomarkers, response to treatment, the patient's age and general state of health are also considered. Criteria are different for specific cancers.

Prognostic Index: A grading system of patient prognosis based upon the number of relevant prognostic factors associated with a specific cancer.

Psychoneuroimmunology (PNI): The study of the effects of emotions and nervous system activity on immune function.

Radiotherapy (radiation therapy, irradiation): Localised treatment of cancer with ionizing radiation. Various methods of application are employed to kill cancer cells. External application is known as external beam irradiation. Internal radiotherapy is called brachytherapy, and involves implantation of radioactive isotopes in or near the tumour. Systemic radiotherapy includes oral ingestion and venous injection of radioactive material.

Regression: A decrease in the size of a tumour or in the severity of cancer in the body.

Relapse: The return of disease or signs and symptoms of disease after remission or a period of improvement.
Remission: A state or period during which the medical signs and symptoms of cancer are abated. It is commonly used to refer to the absence of active cancer which can no longer be detected, even by sophisticated techniques such as CAT scan. There remains the possibility that disease activity could resume.

Sarcoma: Malignant tumours that are derived from connective tissue cells. They are described as originating in two main types of tissue - bone or soft tissue. Examples are osteosarcoma (bone tissue), liposarcoma (fatty tissue). Sarcomas are not considered common tumours.

Sentinel node: The first lymph node (or group of nodes) to receive lymphatic drainage from a primary tumour. Breast cancer and melanoma are commonly evaluated by the use of sentinel node biopsy.

Spontaneous regression or **remission (SR):** Describes recovery or improvement that orthodox medicine cannot explain. The true incidence of SR is unknown, mainly due to inadequate research.

Staging: Staging is undertaken to identify how much cancer is in the body and the extent to which it has spread. The tumour load (burden) indicates the total amount of cancer. It includes the size of the primary tumour plus any metastases. Specific staging systems can be used for different types of cancers. Due to the complexity of cancer

development and spread, different criteria are used for specific cancers. This results in the need for a variety of staging systems. Effective treatment regimes rely on correct staging. The lower numbers on a staging scale indicate a less advanced cancer and a better prognosis. The higher numbers are associated with a more advanced cancer and a poorer prognosis. Staging is assigned at the time of diagnosis and does not change, even if the disease progresses or improves. Commonly used staging classifications include *Ann Arbor, TNM, Summary and Numbered***.**

Ann Arbor staging is primarily used for blood cancers, particularly non-Hodgkins lymphoma. It is based upon the location of the lymphoma cells in the body. Classifications are Stages I, II, III, and IV. Letters such as A and B can also be integrated in to the scoring system. They relate to the particular symptoms being experienced by the patient.

TNM staging is used globally for a wide variety of solid tumours. The letter T describes the size or growth of the tumour. The letter N refers to lymph node involvement. The letter M refers to the presence (or not) of metastases. The numbering system that accompanies the letters is quite complicated and not listed here.

Summary staging is also known as **General staging** or **SEER staging.** It can be applied to all types of cancer. It broadly describes the location of cancer with regard to anatomical location. Staging classifications include: **In situ** (applicable only to carcinoma and melanoma), **Localised, Regional, Distant** and **Unknown.**

Numbered Staging has similar categories to summary staging. They extend from Stages 1 to 4. Stage 1 indicates localised cancer and Stage 4 indicates metastasis. Roman numerals are sometimes used (as in Ann Arbor staging) instead of numbers.

Standard therapy: Therapy that is considered the most effective and safest in current use.

Stem cells: Pluripotent precursor cells that have the ability to form into platelets and all varieties of blood cells.

Stem cell transplantation (SCT): The correct title for this procedure is peripheral blood stem cell transplantation (PBSCT). This is because the blood is collected from a vein in the arm (or central vein) as opposed to stem cells that are harvested directly from bone marrow. Prior to receiving transplantation, the patient receives high dose chemotherapy and/or radiation. This can badly damage or destroy the bone marrow. After transplantation, the newly donated stem cells support the bone marrow in its effort to produce healthy, new blood cells. SCT is most commonly used in the treatment of leukaemia and lymphoma. Types of SCT include *allogeneic, mini-allogeneic, autologous* and *syngeneic*. Umbilical cord blood may also be used.

Allogeneic transplant requires a matched donor. A sibling or close relative is preferred, although an unrelated donor can be used. Prior to donation, medications are given to the donor to increase stem cell production. After collection of stem cells from the blood, the remaining blood is returned to the donor. A serious problem associated with this form of transplant is the development of graft versus host disease (GVHD) where immune cells from the donor can attack cells of the recipient.

M**ini-allogeneic transplant** uses the same mechanism as above to collect the stem cells. However, the patient receives a much lower chemotherapy dose. Using the lower (safer) dose can substantially reduce the mortality rate associated with SCT.

Autologous transplant uses the patient's own, collected stem cells. This method eliminates the risk of GVHD. On the down side, a possible complication of this procedure is the re-introduction of some cancer cells along with the harvested stem cells. This may occur because the process of separating the stem cells from the blood has not yet been perfected. Often a monoclonal antibody (e.g. Rituximab) will be given after transplant to remove any residual malignant cells.

Syngeneic transplant involves stem cell donation from an identical twin (who does not have cancer). In this situation GVHD will not occur.

Targeted cancer therapy: A relatively new approach to cancer treatment which involves the use of nanotechnology to inhibit cancer cell growth and tumor progression. Small molecule drugs are able to target specific molecules inside the cancer cell and on the outside of the cell. Most of the monoclonal antibodies are too large to do so. Their target

molecules are outside the cell or on the cell membrane. Some monoclonal antibodies and therapeutic cancer vaccines have a very different mode of action. They are used to stimulate immune function by helping the immune cells identify and destroy cancer cells. It is hoped that targeted cancer therapy might have less side effects than current chemotherapy.

Teratogenicity: Impaired fetal development caused by radiation and chemotherapy. The effects will vary with the agent/s used, the dosage and the timing in relation to the pregnancy. The greatest risk is during the 1st trimester when the embryonic or fetal cells are rapidly dividing. Termination may be recommended.

Thrombocytopenia: An abnormally low number of platelets in the blood circulation. There are many causes. They include bone marrow dysfunction from various cancers or chemotherapy. A spleen enlarged by cancer can trap huge numbers of platelets, resulting in a reduced number in the circulation. Liver disease may also cause thrombocytopenia. Thrombocytopenic patients usually bruise easily and may be at risk of haemorrhage.

Tomography: Includes a variety of techniques for displaying a representation of a cross section through a human body or other solid object. Techniques can include the use of X-rays, gamma rays, ultrasonic waves and magnetic resonance imaging.

Transformation: A term used to describe the change of a normal, healthy cell to a malignant one. Transformation can also describe the movement of a cancer classification from one grade to another e.g. low grade to high grade, or the development of one kind of cancer from another.

Translocation: The movement of a chromosomal segment to a new position, either on the same chromosome or on to a different one. The rearrangement of genes can cause cancer and other medical conditions.

Tumour (Neoplasm): A tumour is an abnormal mass of tissue that displays progressive, uncontrolled cell multiplication. It may be malignant or benign. The suffix "oma" added to a word indicates a tumour.

> **Malignant tumour:** A malignant tumour contains cells that have altered physiological function and can spread to other parts of the body e.g. carcinoma, melanoma, lymphoma, sarcoma.
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> **Benign tumour:** A benign tumour contains an increased number of cells that do not invade surrounding tissue and do not spread to other parts of the body e.g. fibroma, lipoma, adenoma. However, some benign tumours (e.g. tubular adenoma) can experience genetic change and progress to a malignant state.

Tumour Lysis Syndrome (TLS): This is a life-threatening condition. It is associated with a heavy tumour burden and fast growing cancers such as aggressive lymphomas and some high-grade solid tumours. It can occur spontaneously when a rapidly growing tumour outstrips its blood supply, or after initiation of cytotoxic therapy. The treatment-responsive cancer cells die en masse, releasing large quantities of cellular contents that affect metabolic balance. The resulting shock can cause renal failure and cardiac arrest.

Tumour markers: Tumour markers are measurable biochemicals (mainly proteins) produced by a malignancy, or by the body in response to a malignancy. These substances are usually produced by normal, healthy cells as well as cancer cells, but are found in much higher quantities when cancer is present. They can be measured in tissue or bodily fluids such as blood and urine. They can be helpful in establishing the diagnosis and progression of cancer, and are commonly used to monitor cancer treatment. More than 20 tumour markers are currently in use. Some markers are specific to only one type of cancer, while others are associated with two or more types. It is possible to have elevated levels of tumour markers without having a malignancy.

Ultrasound (echography, sonography, ultrasonography): A radiologic imaging technique used to visualise deep structures of the body by recording the reflections (echoes) of high-frequency sound (ultrasonic) waves directed into the tissues.

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The author's new book "To CANCER with LOVE" is due for release in 2017.