**Final-Term Assignment**

**Course Title: Basic Physiology I**

**MLT 1st semester**

**Instructor: Dr. M .Shahzeb khan (PT)**

**Marks: 50**

**Note:**

* **Attempt all questions, all questions carry equal marks.**
* **Answer Briefly and to the point, avoid un-necessary details**

**Name: Irfan ullah ID: 15810 Summer. Paper**

Q1: What is Lymphatic system? Write different Parts of Lymphatic system as well.

**Ans.**   The Lymphatic system is part of the immune system and help destroy microorganism that enter the body. Your Lymphatic system work closely with your circulatory system both system move liquid through the body. And Both contain white blood cell.

The lymphatic system is a network of tissues, vessels and organs that work together to move a colorless, watery fluid called lymph back into your circulatory system (your bloodstream).

Some 20 liters of plasma flow through your body’s arteries and smaller arteriole blood vessels and capillaries every day. After delivering nutrients to the body’s cells and tissues and receiving their waste products, about 17 liters are returned to the circulation by way of veins. The remaining three liters seep through the capillaries and into your body’s tissues. The lymphatic system collects this excess fluid, now called lymph, from tissues in your body and moves it along until it ultimately returns it to your bloodstream

**Parts of the Lymphatic system**

**The lymphatic system consists of many parts. These include:**

* **Lymph:**Lymph, also called lymphatic fluid, is a collection of the extra fluid that drains from cells and tissues (that is not reabsorbed into the capillaries) plus other substances. The other substances include proteins, minerals, fats, nutrients, damaged cells, cancer cells and foreign invaders (bacteria, viruses, etc). Lymph also transports infection-fighting white blood cells (lymphocytes).
* **Lymph nodes:**Lymph nodes are bean-shaped glands that monitor and cleanse the lymph as it filters through them. The nodes filter out the damaged cells and cancer cells. These lymph nodes also produce and store lymphocytes and other immune system cells that attack and destroy bacteria and other harmful substances in the fluid. You have about 600 lymph nodes scattered throughout your body. Some exist as a single node; others are closely connected groups called chains. A few of the more familiar locations of lymph nodes are in your armpit, groin and neck. Lymph nodes are connected to others by the lymphatic vessels.·
* **Lymphatic vessels:**Lymphatic vessels are the network of capillaries (microvessels) and large network of tubes located throughout the body that transport lymph away from tissues. Lymphatic vessels collect and filter lymph (at the nodes) as it continues to move toward larger vessels called collecting ducts. These vessels operate very much like your veins do: they work under very low pressure, have a series of valves in them to keep the fluid moving in one direction.
* **Collecting ducts:**Lymphatic vessels empty the lymph into the right lymphatic duct and left lymphatic duct (also called the thoracic duct). These ducts connect to the subclavian vein, which returns lymph to your bloodstream. The subclavian vein runs below your collarbone. Returning lymph to the bloodstream helps to maintain normal blood volume and pressure. It also prevents the excess buildup of fluid around the tissues (called edema).
* **Spleen:** This largest lymphatic organ is located on your left side under your ribs and above your stomach. The spleen filters and stores blood and produces white blood cells that fight infection or disease.
* **Thymus:** This organ is located in the upper chest beneath the breast bone. It matures a specific type of white blood cell that fights off foreign organisms.
* **Tonsils and adenoid:** These lymphoid organs trap pathogens from the food you eat and air you breathe. They are your body’s first line of defense against foreign invaders.
* **Bone marrow:**This is the soft, spongy tissue in the center of certain bones, such as the hip bone and breastbone. White blood cells, red blood cells, and platelets are made in the bone marrow.
* **Peyer’s patches:** These are small masses of lymphatic tissue in the mucous membrane that lines your small intestine. These lymphoid cells monitor and destroy bacteria in the intestines.
* **Appendix:** Your appendix contains lymphoid tissue that can destroy bacteria before it breaches the intestine wall during absorption. Scientists also believe the appendix plays a role in housing “good bacteria” and repopulating our gut with good bacteria after an infection has cleared.

Q2: What is Immunity? Write down different Types of Immunity.

**Ans.** **Immunity:**

Immunity is the ability of the body to defend itself against disease-causing organisms. Everyday our body comes in contact with several pathogens, but only a few results into diseases. The reason is, our body has the ability to release antibodies against these pathogens and protects the body against diseases. This defence mechanism is called immunity.

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There are two major types of immunity:

1. Innate Immunity or Natural or Non-specific Immunity.
2. Acquired Immunity or Adaptive Immunity.

This type of immunity is present in an organism by birth.

This is activated immediately when the pathogen attacks. Innate immunity includes certain barriers and defence mechanisms that keep foreign particles out of the body.

Innate immunity refers to the body’s defence system.

This immunity helps us by providing the natural resistance components including salivary enzymes, natural killer cells, intact skin and neutrophils, etc. which produce an initial response against the infections at birth prior to exposure to a pathogen or antigens.

It is a long-term immunity in which our body produces the antibodies on its own. Our body has few natural barriers to prevent the entry of pathogens.

### **Cells Involved In Innate Immunity**

* **Phagocytes**: These circulate through the body and look for any foreign substance. They engulf and destroy it defending the body against that pathogen.
* **Macrophages**: These have the ability to move across the walls of the circulatory system. They release certain signals as cytokines to recruit other cells at the site of infections.
* **Mast Cells**: These are important for healing wounds and defence against infections.
* **Neutrophils**: These contain granules that are toxic in nature and kill any pathogen that comes in contact.
* **Eosinophils**: These contain highly toxic proteins that kill any bacteria or parasite in contact.
* **Basophils**: These attack multicellular parasites. Like the mast cells, these release histamine.
* **Natural Killer Cells**: These stop the spread of infections by destroying the infected host cells.
* **Dendritic Cells**: These are located in the tissues that are the points for initial infections. These cells sense the infection and send the message to the rest of the immune system by antigen presentation

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**Acquired immunity** or adaptive immunity is the immunity that our body acquires or gains over time. Unlike the innate immunity, this is not present by birth.

The ability of the immune system to adapt itself to disease and to generate pathogen-specific immunity is termed as acquired immunity. It is also known as adaptive immunity.

An individual acquires the immunity after the birth, hence is called as the acquired immunity.

It is specific and mediated by antibodies or lymphocytes which make the antigen harmless.

The main function of acquired immunity is to relieve the victim of the infectious disease and also prevent its attack in future.

It mainly consists of an advanced lymphatic defence system which functions by recognizing the own body cells and not reacting to them

The acquired immunity in our body has certain special features.

### **Features of Acquired Immunity**

* **Specificity**: Our body has the ability to differentiate between different types of pathogens, whether it is harmful or not, and devise ways to destroy them.
* **Diversity**: Our body can detect vast varieties of pathogens, ranging from protozoa to viruses.
* **Differentiate between self and non-self**: Our body has the unique ability to differentiate between its own cells and foreign cells. It immediately starts rejecting any foreign cell in the body.
* **Memory**: Once our body encounters a pathogen, it activates the immune system to destroy it. It also remembers what antibodies were released in response to that pathogen, so that, the next time it enters, a similar procedure is followed by the body to eliminate it.

### **Cells Involved in Acquired Immunity**

The acquired immunity involves two types of cells: B-cells and T-cells

##### **B-cells**

* They develop in the bone marrow.
* These cells are activated on their encounter with foreign agents. These foreign particles act as foreign markers.
* The B-cells immediately differentiate into plasma cells which produce antibodies specific to that foreign particle or so-called antigen.
* These antibodies attach to the surface of the antigen/foreign agent.
* These antibodies detect any antigen in the body and destroy it.
* The immunity dependent on B-cells is called humoral immunity.

##### **T-cells**

* They originate in the bone marrow and develop in the thymus.
* T-cells differentiate into helper cells, cytotoxic cells, and regulatory cells. These cells are released into the bloodstream.
* When these cells are triggered by an antigen, helper T-cells release cytokines that act as messengers.
* These cytokines initiate the differentiation of B-cells into plasma cells which release antibodies against the antigens.
* The cytotoxic T-cells kills the cancer cells.
* Regulatory T-cells regulate immune reactions.

Q3: Write a note on Visual Sense (Eye).

**Ans.** The visual system comprises the sensory organ (the [eye](https://en.m.wikipedia.org/wiki/Eye)) and the part of the [central nervous system](https://en.m.wikipedia.org/wiki/Central_nervous_system) which gives organisms the ability to [process visual detail](https://en.m.wikipedia.org/wiki/Visual_perception) as [sight](https://en.m.wikipedia.org/wiki/Sight), as well as enabling the formation of several non-image photo response functions. It detects and interprets information from [visible light](https://en.m.wikipedia.org/wiki/Visible_light) (visible to that species) to "build a representation" of the surrounding environment. The visual system carries out a number of complex tasks, including the reception of light and the formation of monocular representations, the neural mechanisms underlying stereo vision, the identification and categorization of visual objects, assessing distances to and between objects, motion perception, guiding body movements in relation to the objects seen, colour vision, and more. The psychological side of visual information procesing is known as [visual perception](https://en.m.wikipedia.org/wiki/Visual_perception), a lack of which is called [blindness](https://en.m.wikipedia.org/wiki/Blindness). Non-image forming visual functions, independent of visual perception, include (among others) the [pupillary light reflex](https://en.m.wikipedia.org/wiki/Pupillary_light_reflex) (PLR) and circadian [photoentrainment](https://en.m.wikipedia.org/wiki/Entrainment_(chronobiology)" \o "Entrainment (chronobiology))

**Visual effect of the eye**

Myopia: (nearsightedness) This is a defect of vision in which far objects appear blurred but near objects are seen clearly. The image is focused in front of the retina rather than on it usually because the eyeball is too long or the refractive power of the eye's lens too strong.

**Structure.**

**Eye:** Light entering the eye is [refracted](https://en.m.wikipedia.org/wiki/Refracted) as it passes through the [cornea](https://en.m.wikipedia.org/wiki/Cornea). It then passes through the [pupil](https://en.m.wikipedia.org/wiki/Pupil) (controlled by the [iris](https://en.m.wikipedia.org/wiki/Iris_(anatomy))) and is further refracted by the [lens](https://en.m.wikipedia.org/wiki/Lens_(vision)). The cornea and lens act together as a compound lens to project an inverted image onto the retina

**Retina:** The retina consists of a large number of [photoreceptor cells](https://en.m.wikipedia.org/wiki/Photoreceptor_cell) which contain particular [protein](https://en.m.wikipedia.org/wiki/Protein) [molecules](https://en.m.wikipedia.org/wiki/Molecule) called [opsins](https://en.m.wikipedia.org/wiki/Opsin" \o "Opsin). In humans, two types of opsins are involved in conscious vision: [rod opsins](https://en.m.wikipedia.org/wiki/Rod_cell) and [cone opsins](https://en.m.wikipedia.org/wiki/Cone_cell). (A third type, [melanopsin](https://en.m.wikipedia.org/wiki/Melanopsin" \o "Melanopsin) in some of the retinal ganglion cells (RGC), part of the body clock mechanism, is probably not involved in conscious vision, as these RGC do not project to the [lateral geniculate nucleus](https://en.m.wikipedia.org/wiki/Lateral_geniculate_nucleus) but to the [pretectal olivary nucleus](https://en.m.wikipedia.org/wiki/Pretectal_area" \o "Pretectal area).[[23]](https://en.m.wikipedia.org/wiki/Visual_system#cite_note-23)) An opsin absorbs a [photon](https://en.m.wikipedia.org/wiki/Photon) (a particle of light) and transmits a signal to the [cell](https://en.m.wikipedia.org/wiki/Cell_(biology)) through a [signal transduction pathway](https://en.m.wikipedia.org/wiki/Signal_transduction_pathway), resulting in hyper-polarization of the photoreceptor.

**Optic nerve:** The information about the image via the eye is transmitted to the brain along the [optic nerve](https://en.m.wikipedia.org/wiki/Optic_nerve). Different populations of ganglion cells in the retina send information to the brain through the optic nerve. About 90% of the [axons](https://en.m.wikipedia.org/wiki/Axons) in the optic nerve go to the [lateral geniculate nucleus](https://en.m.wikipedia.org/wiki/Lateral_geniculate_nucleus) in the [thalamus](https://en.m.wikipedia.org/wiki/Thalamus). These axons originate from the M, P, and K ganglion cells in the retina, see above. This [parallel processing](https://en.m.wikipedia.org/wiki/Parallel_processing_(psychology)) is important for reconstructing the visual world; each type of information will go through a different route to [perception](https://en.m.wikipedia.org/wiki/Perception). Another population sends information to the [superior colliculus](https://en.m.wikipedia.org/wiki/Superior_colliculus) in the [midbrain](https://en.m.wikipedia.org/wiki/Midbrain), which assists in controlling eye movements

**Optic chiasm**: The optic nerves from both eyes meet and cross at the optic chiasm, at the base of the [hypothalamus](https://en.m.wikipedia.org/wiki/Hypothalamus) of the brain. At this point the information coming from both eyes is combined and then splits according to the [visual field](https://en.m.wikipedia.org/wiki/Visual_field). The corresponding halves of the field of view (right and left) are sent to the left and right halves of the brain, respectively, to be processed. That is, the right side of primary visual cortex deals with the left half of the *field of view* from both eyes, and similarly for the left brain.[[30]](https://en.m.wikipedia.org/wiki/Visual_system#cite_note-nolte-30) A small region in the center of the field of view is processed redundantly by both halves of the brain

**Optict tract.** Information from the right *visual field* (now on the left side of the brain) travels in the left optic tract. Information from the left *visual field* travels in the right optic tract. Each optic tract terminates in the [lateral geniculate nucleus](https://en.m.wikipedia.org/wiki/Lateral_geniculate_nucleus) (LGN) in the thalamus.

**lateral geniculate nucleus** (LGN) is a sensory relay nucleus in the thalamus of the brain. The LGN consists of six layers in [humans](https://en.m.wikipedia.org/wiki/Human) and other [primates](https://en.m.wikipedia.org/wiki/Primate) starting from catarhinians, including cercopithecidae and apes. Layers 1, 4, and 6 correspond to information from the contralateral (crossed) fibers of the nasal retina (temporal visual field); layers 2, 3, and 5 correspond to [information](https://en.m.wikipedia.org/wiki/Information) from the ipsilateral (uncrossed) fibers of the temporal retina (nasal visual field). Layer one (1) contains M cells which correspond to the M (magnocellular) cells of the optic nerve of the opposite eye and are concerned with depth or motion. Layers four and six (4 & 6) of the LGN also connect to the opposite eye, but to the P cells (color and edges) of the optic nerve. By contrast, layers two, three and five (2, 3, & 5) of the LGN connect to the M cells and P (parvocellular) cells of the optic nerve for the same side

**Optic radiation:**  The optic radiations, one on each side of the brain, carry information from the thalamic [lateral geniculate nucleus](https://en.m.wikipedia.org/wiki/Lateral_geniculate_nucleus) to layer 4 of the [visual cortex](https://en.m.wikipedia.org/wiki/Visual_cortex). The P layer neurons of the LGN relay to V1 layer 4C β. The M layer neurons relay to V1 layer 4C α. The K layer neurons in the LGN relay to large neurons called blobs in layers 2 and 3 of V1.

Q4: Write a detail note on Physiology of Smell.

**Ans.** Vaporized odor molecules (chemicals) floating in the air reach the nostrils and dissolve in the mucus (which is on the roof of each nostril). Underneath the mucus, in the olfactory epithelium, specialized receptor cells called olfactory receptor neurons detect the odor

Olfaction uses chemoreceptors that create signals processed in the brain that form the sense of smell. Olfaction, or the sense of smell, is the process of creating the perception of smell. It occurs when an odor binds to a receptor within the nose, transmitting a signal through the olfactory system.

System: [Olfactory system](https://www.google.com/search?client=ms-android-samsung&v=11.19.13.21.arm&biw=360&bih=640&hl=en-GB&cds=0&sxsrf=ALeKk00DcGgOzkCQKws-l5SV97cKoY6gSQ:1600866652672&q=Olfactory+system&stick=H4sIAAAAAAAAAONgVuLUz9U3MKoytsxbxCrgn5OWmFySX1SpUFxZXJKaCwAoaf6QIAAAAA&sa=X&ved=2ahUKEwjqvKiBrf_rAhXHx4UKHRNIBg4QmxMoADANegQIDRAC)

Function: sense chemicals in the environment that are used to form the [sense of smell](https://www.google.com/search?client=ms-android-samsung&v=11.19.13.21.arm&biw=360&bih=640&hl=en-GB&cds=0&sxsrf=ALeKk00DcGgOzkCQKws-l5SV97cKoY6gSQ:1600866652672&q=sense+of+smell&stick=H4sIAAAAAAAAAONgVuLUz9U3MDSpNDVexMpXnJpXnKqQn6ZQnJuakwMAd_QpLx4AAAA&sa=X&ved=2ahUKEwjqvKiBrf_rAhXHx4UKHRNIBg4QmxMoADAOegQIDhAC)

**Function.**

The sense of the smell allows to perceive and to differentiate the odours. Based on the emotions evoked by different odours they are classified to positive, negative or neutral. Smell receptors are chemical receptors and telereceptors. Adequate stimuli are odour molecules dispersed in the air.

**Deasese make you smell bad**

Trimethylaminuria is a disorder in which the body is unable to break down trimethylamine, a chemical compound that has a pungent odor. Trimethylamine has been described as smelling like rotting fish, rotting eggs, garbage, or urine

**foods and drinks that affect body odor**

* Cruciferous Vegetables. Broccoli, cauliflower, cabbage and kale are just a few of the more popular cruciferous vegetables.
* Asparagus. Eating asparagus can result in urine that smells like rotten cabbage due to sulfur compounds.
* Garlic, Onions, Cumin and Curry
* Seafood.
* Alcohol.

Q5: Write down detail of Diseases, related to Parathyroid Gland

**Ans.**

**Parathyroid Glands**

Parathyroid glands are four small glands of the endocrine system which regulate the calcium in our bodies. Parathyroid glands are located in the neck behind the thyroid where they continuously monitor and regulate blood calcium levels.

**DISEASES RELATED TO PARATHYROID GLAND**

**1.RICKETS:**

* It is a disease characterized  mainly by bone deformities in young children’s
* The disease of children sets

in about 6th month of life

**Characteristic features: -**

* Deformed bones
* Thick wrist and ankles
* Retarded growth

**2. OSTEOMALACIA: -**

* This is due to *inadequate  absorption of calcium*

due to deficiency of *Vitamin D  and Calcium* in the diet

* The disease is limited to females,  usually appears *after multiple*

*pregnancies and lactation.*

Many conditions are associated with disorders of the function of the [parathyroid gland](https://en.m.wikipedia.org/wiki/Parathyroid_gland). **Parathyroid diseases** can be divided into those causing [hyperparathyroidism](https://en.m.wikipedia.org/wiki/Hyperparathyroidism), and those causing [hypoparathyroidism](https://en.m.wikipedia.org/wiki/Hypoparathyroidism" \o "Hypoparathyroidism)

[Hyperparathyroidism](https://en.m.wikipedia.org/wiki/Hyperparathyroidism) was first described in 1925 and the symptoms have collectively become known as "[moans](https://en.m.wikipedia.org/wiki/Moan), groans, [stones](https://en.m.wikipedia.org/wiki/Kidney_stone), and [bones](https://en.m.wikipedia.org/wiki/Fracture_(bone))." By far, the most common symptom is fatigue, but depression, memory loss, and bone aches are also very common. [Primary hyperparathyroidism](https://en.m.wikipedia.org/wiki/Primary_hyperparathyroidism) is relatively more common in [postmenopausal](https://en.m.wikipedia.org/wiki/Postmenopausal) women. The primary treatment for this disease is the surgical removal of the faulty gland

Hyperparathyroidism is a condition caused by overproduction of PTH, and can be divided into three types

Primary hyperparathyroidism happens when the normal mechanism of regulation by negative feedback of calcium is interrupted, or in other words the amount of blood calcium would ordinarily signal less production of PTH. Most of the time this is caused by adenomas, hyperplasia or carcinomas

2 Secondary hyperparathyroidism normally occurs in patients that suffer [chronic kidney disease](https://en.m.wikipedia.org/wiki/Chronic_kidney_disease). Poor kidney function leads to a mineral disequilibrium that causes the glands hypertrophy in order to synthesize and release more PTH

3 Tertiary hyperparathyroidism develops when the hyperplastic gland of secondary hyperparathyroidism constantly releases PTH, independent of the regulation systems

Another condition is hypercalcemia, which refers to a calcium level above 10.5 mg/dL. Consequences of this are heart rhythm diseases, and extra production of gastrin that causes peptic ulcers

**Pseudohypoparathyroidism** is a condition associated primarily with resistance to the [parathyroid hormone](https://en.m.wikipedia.org/wiki/Parathyroid_hormone). Those with the condition have a low serum [calcium](https://en.m.wikipedia.org/wiki/Calcium) and high [phosphate](https://en.m.wikipedia.org/wiki/Phosphate), but the parathyroid hormone level (PTH) is appropriately high (due to the low level of calcium in the blood). Its pathogenesis has been linked to dysfunctional [G Proteins](https://en.m.wikipedia.org/wiki/G_Proteins) (in particular, [Gs alpha subunit](https://en.m.wikipedia.org/wiki/Gs_alpha_subunit" \o "Gs alpha subunit)). The condition is extremely rare, with an estimated overall prevalence of 7.2/1,000,000 or approximately 1/140,000.

**Diagnoses.**

**Hypocalcaemia** is low [calcium](https://en.m.wikipedia.org/wiki/Calcium) levels in the [blood serum](https://en.m.wikipedia.org/wiki/Blood_serum).[[5]](https://en.m.wikipedia.org/wiki/Hypocalcaemia#cite_note-5) The normal range is 2.1–2.6 [mmol/L](https://en.m.wikipedia.org/wiki/Mmol/L" \o "Mmol/L) (8.8–10.7 [mg/dl](https://en.m.wikipedia.org/wiki/Mg/dl), 4.3–5.2 [mEq/L](https://en.m.wikipedia.org/wiki/MEq/L" \o "MEq/L)) with levels less than 2.1 mmol/l defined as hypocalcemia. Mildly low levels that develop slowly often have no symptoms. Otherwise symptoms may include [numbness](https://en.m.wikipedia.org/wiki/Paresthesia), [muscle spasms](https://en.m.wikipedia.org/wiki/Muscle_spasms), [seizures](https://en.m.wikipedia.org/wiki/Seizures), confusion, or [cardiac arrest](https://en.m.wikipedia.org/wiki/Cardiac_arrest).[[1]](https://en.m.wikipedia.org/wiki/Hypocalcaemia#cite_note-EU2010-1)[[2]](https://en.m.wikipedia.org/wiki/Hypocalcaemia#cite_note-Fong2012-2)

**Hyperphosphatemia** is an [electrolyte disorder](https://en.m.wikipedia.org/wiki/Electrolyte_disorder) in which there is an elevated level of [phosphate](https://en.m.wikipedia.org/wiki/Phosphate) in the [blood](https://en.m.wikipedia.org/wiki/Blood)  Most people have no symptoms while others develop [calcium deposits](https://en.m.wikipedia.org/wiki/Ectopic_calcification) in the soft tissue  Often there is also [low calcium](https://en.m.wikipedia.org/wiki/Low_calcium) levels which can result in muscle spasms.

**Parathyroid hormone**(PTH), also called parathormone or parathyrin, is a [hormone](https://en.m.wikipedia.org/wiki/Hormone) secreted by the [parathyroid glands](https://en.m.wikipedia.org/wiki/Parathyroid_gland) that regulates the [serum calcium](https://en.m.wikipedia.org/wiki/Serum_calcium) concentration through its effects on bone, kidney, and intestine

**Calcitriol** is the active form of [vitamin D](https://en.m.wikipedia.org/wiki/Vitamin_D), normally made in the [kidney](https://en.m.wikipedia.org/wiki/Kidney)  A manufactured form is used to treat [kidney disease](https://en.m.wikipedia.org/wiki/Kidney_disease) with [low blood calcium](https://en.m.wikipedia.org/wiki/Hypocalcemia), [hyperparathyroidism](https://en.m.wikipedia.org/wiki/Hyperparathyroidism) due to kidney disease, low blood calcium due to [hypoparathyroidism](https://en.m.wikipedia.org/wiki/Hypoparathyroidism" \o "Hypoparathyroidism), [osteoporosis](https://en.m.wikipedia.org/wiki/Osteoporosis), [osteomalacia](https://en.m.wikipedia.org/wiki/Osteomalacia), and [familial hypophosphatemia](https://en.m.wikipedia.org/wiki/Familial_hypophosphatemia) It is taken by mouth or by [injection into a vein](https://en.m.wikipedia.org/wiki/Intravenous)

**Parathyroid carcinoma** is a rare cancer resulting in parathyroid adenoma to carcinoma progression  It forms in tissues of one or more of the [parathyroid glands](https://en.m.wikipedia.org/wiki/Parathyroid_glands) (four [pea-sized](https://en.m.wikipedia.org/w/index.php?title=Pea-sized&action=edit&redlink=1) [glands](https://en.m.wikipedia.org/wiki/Glands) in the neck that make [parathyroid hormone](https://en.m.wikipedia.org/wiki/Parathyroid_hormone) (PTH). PTH helps the body maintain normal levels of serum [calcium](https://en.m.wikipedia.org/wiki/Calcium) by promoting calcium reabsorption from bone. It is antagonized by the hormone [calcitonin](https://en.m.wikipedia.org/wiki/Calcitonin), which prompts calcium storag

**THE END.**