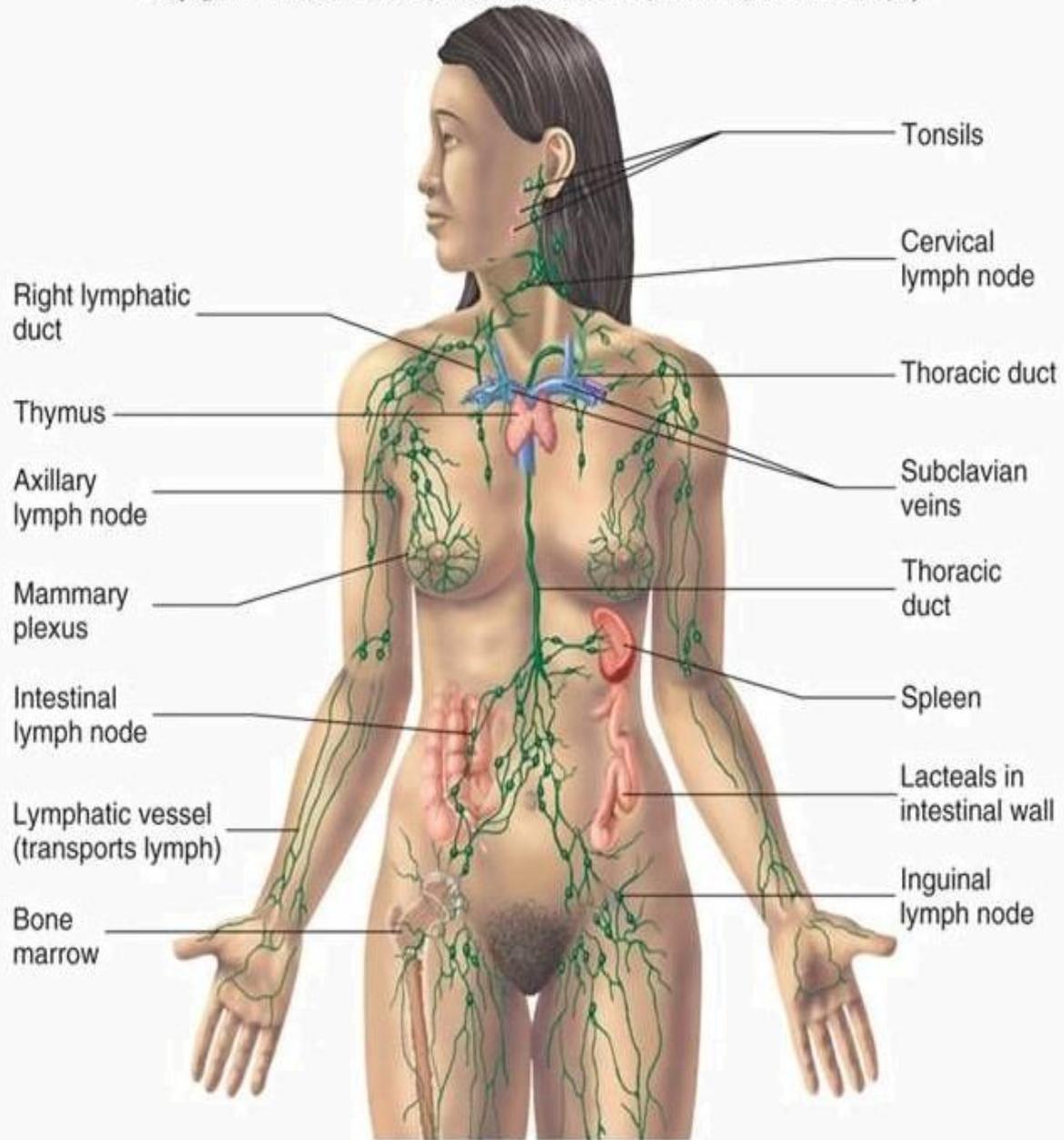
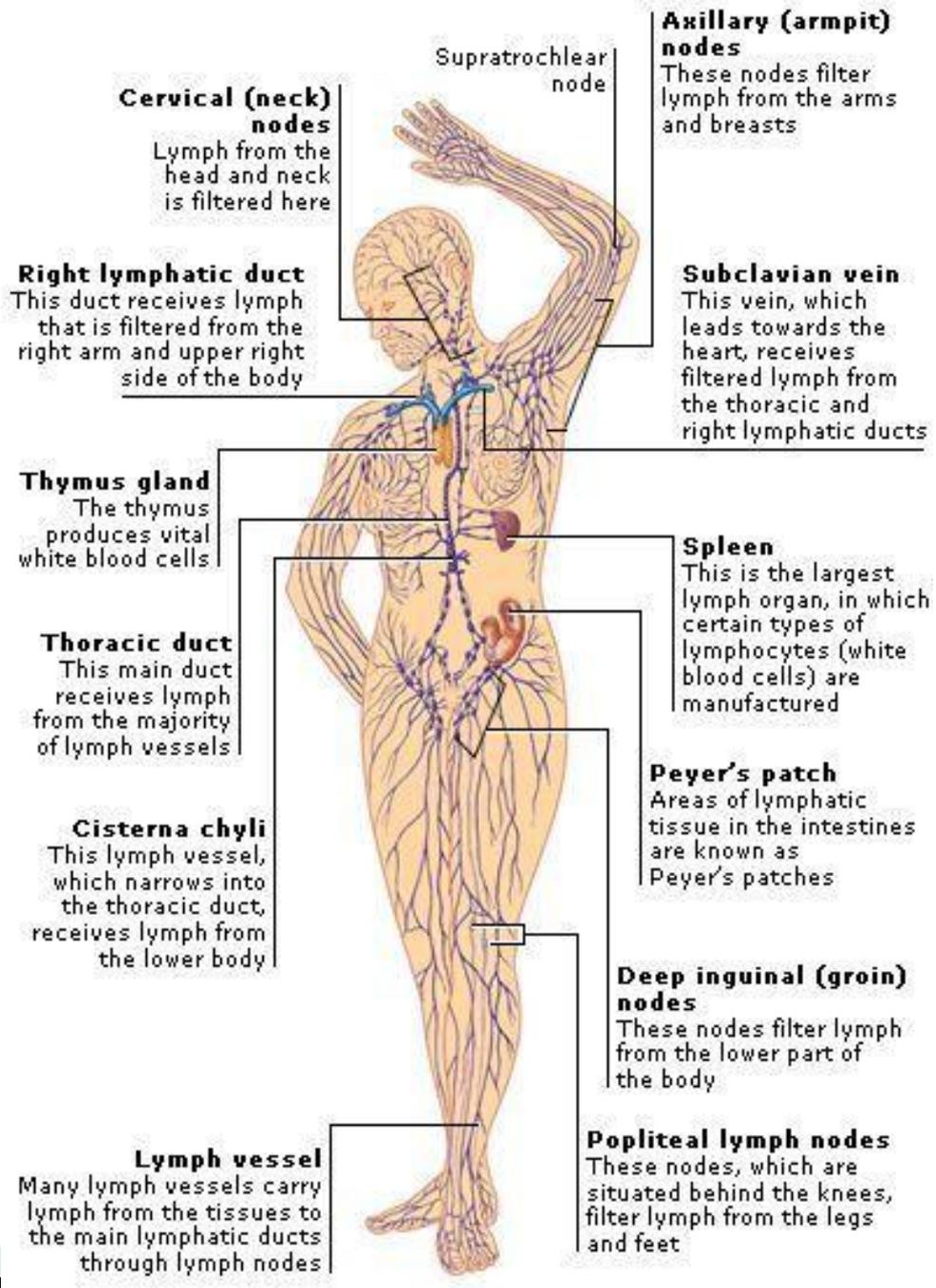


LYMPH SYSTEM

Rajko Bisevac ND, ABAAHP, FAARFM
tel: 630-846-1400
PURELIFEHEALTH@YAHOO.COM





Cervical (neck) nodes

Lymph from the head and neck is filtered here

Axillary (armpit) nodes

These nodes filter lymph from the arms and breasts

Right lymphatic duct

This duct receives lymph that is filtered from the right arm and upper right side of the body

Subclavian vein

This vein, which leads towards the heart, receives filtered lymph from the thoracic and right lymphatic ducts

Thymus gland

The thymus produces vital white blood cells

Spleen

This is the largest lymph organ, in which certain types of lymphocytes (white blood cells) are manufactured

Thoracic duct

This main duct receives lymph from the majority of lymph vessels

Peyer's patch

Areas of lymphatic tissue in the intestines are known as Peyer's patches

Cisterna chyli

This lymph vessel, which narrows into the thoracic duct, receives lymph from the lower body

Deep inguinal (groin) nodes

These nodes filter lymph from the lower part of the body

Lymph vessel

Many lymph vessels carry lymph from the tissues to the main lymphatic ducts through lymph nodes

Popliteal lymph nodes

These nodes, which are situated behind the knees, filter lymph from the legs and feet

OUTLINE

I. COMPONENTS

II. FUNCTION

III. PROTOCOL



NETWORK

- ▶ Organs
 - ▶ Lymph nodes
 - ▶ Lymph ducts
 - ▶ Lymph vessels
 - ▶ Lymph tissues
 - ▶ Lymph capillaries
- 

I. – COMPONENTS

1. **LYMPH**
 2. **VESSELS** that transport the lymph
 3. **ORGANS** that contain **LYMPHOID TISSUES**
- 

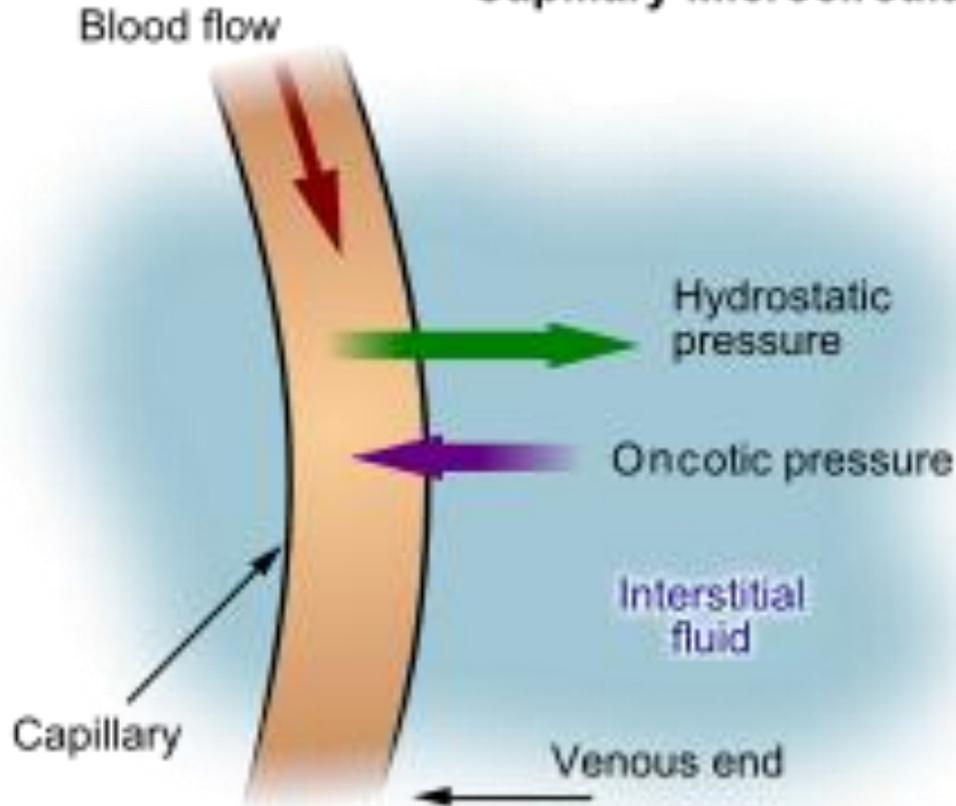
1) LYMPH... what is it?

- ▶ Lymph (Latin, Lympha - **“WATER”** (ancient Roman Deity for fresh water))
- ▶ Clear-to-white fluid made of:
 - White blood cells
 - Fluid from the intestines called chyle, which contains proteins and fat
- ▶ The fluid that flows through the lymphatic system, a system composed of lymph vessels (channels) and intervening lymph nodes whose function, like the venous system, is to return fluid from the tissues to the central circulation.
- ▶ Lymph is a fluid similar in composition to **blood plasma**. It is derived from blood plasma as fluids pass through capillary walls at the arterial end. As the interstitial fluid begins to accumulate, it is picked up and removed by tiny lymphatic vessels and returned to the blood. As soon as the interstitial fluid enters the lymph capillaries, it is called lymph. Returning the fluid to the blood prevents edema and helps to maintain normal blood volume and pressure.

- ▶ Interstitial fluid – the fluid which is between the cells in all body tissues – enters the lymph capillaries. This lymphatic fluid is then transported via progressively larger lymphatic vessels through lymph nodes, where substances are removed by tissue lymphocytes and circulating lymphocytes are added to the fluid, before emptying ultimately into the right or the left subclavian vein, where it mixes with central venous blood.

- ▶ Since the lymph is derived from the interstitial fluid, its **composition continually changes** as the blood and the surrounding cells continually exchange substances with the interstitial fluid. It is generally similar to blood plasma, which is the fluid component of blood. Lymph returns proteins and excess interstitial fluid to the bloodstream. Lymph also transports fats from the digestive system (beginning in the lacteals) to the blood via chylomicrons.
- ▶ Bacteria may enter the lymph channels and be transported to lymph nodes, where they are destroyed. Metastatic cancer cells can also be transported via lymph.

Capillary Microcirculation



Formation of interstitial fluid from blood. Starling forces are labelled: the hydrostatic pressure is higher proximally, driving fluid out; oncotic forces are higher distally, pulling fluid in.

The Starling Forces

- ▶ The Starling equation for fluid filtration is named for the British physiologist Ernest Starling, who is also recognized for the Frank–Starling law of the heart. The classic Starling equation has in recent years been revised. The Starling principle of fluid exchange is key to understanding how plasma fluid (solvent) within the bloodstream (intravascular fluid) moves to the space outside the bloodstream (extravascular space). Starling can be credited with identifying that the "absorption of isotonic salt solutions (from the extravascular space) by the blood vessels is determined by this osmotic pressure of the serum proteins." (1896)
- ▶ The principles behind the equation are considered useful for explaining physiological phenomena happening at the capillary such as the formation of edema.
- ▶ Woodcock and Woodcock showed in 2012 that the revised Starling equation (steady-state Starling principle) provides scientific explanations for clinical observations concerning intravenous fluid therapy.

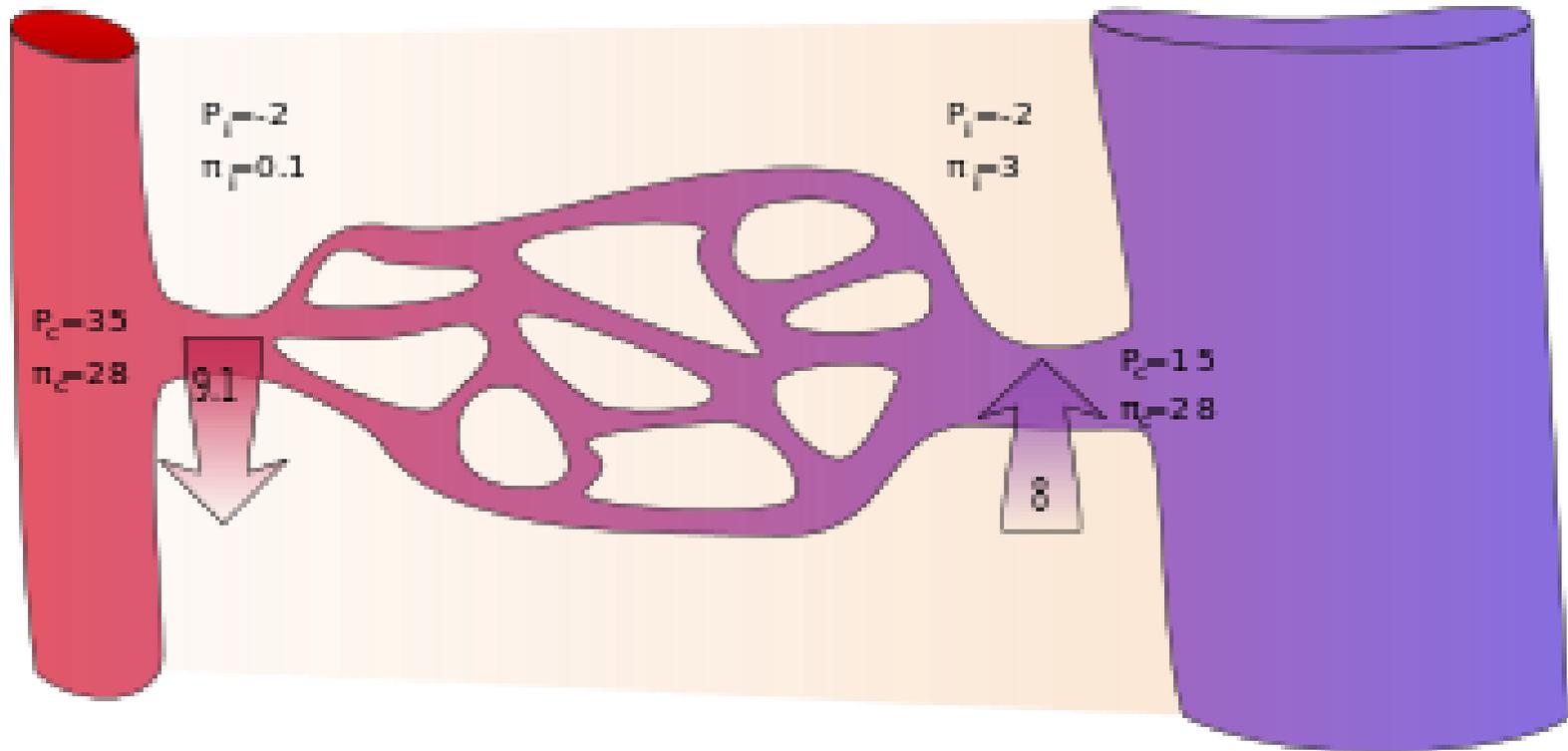
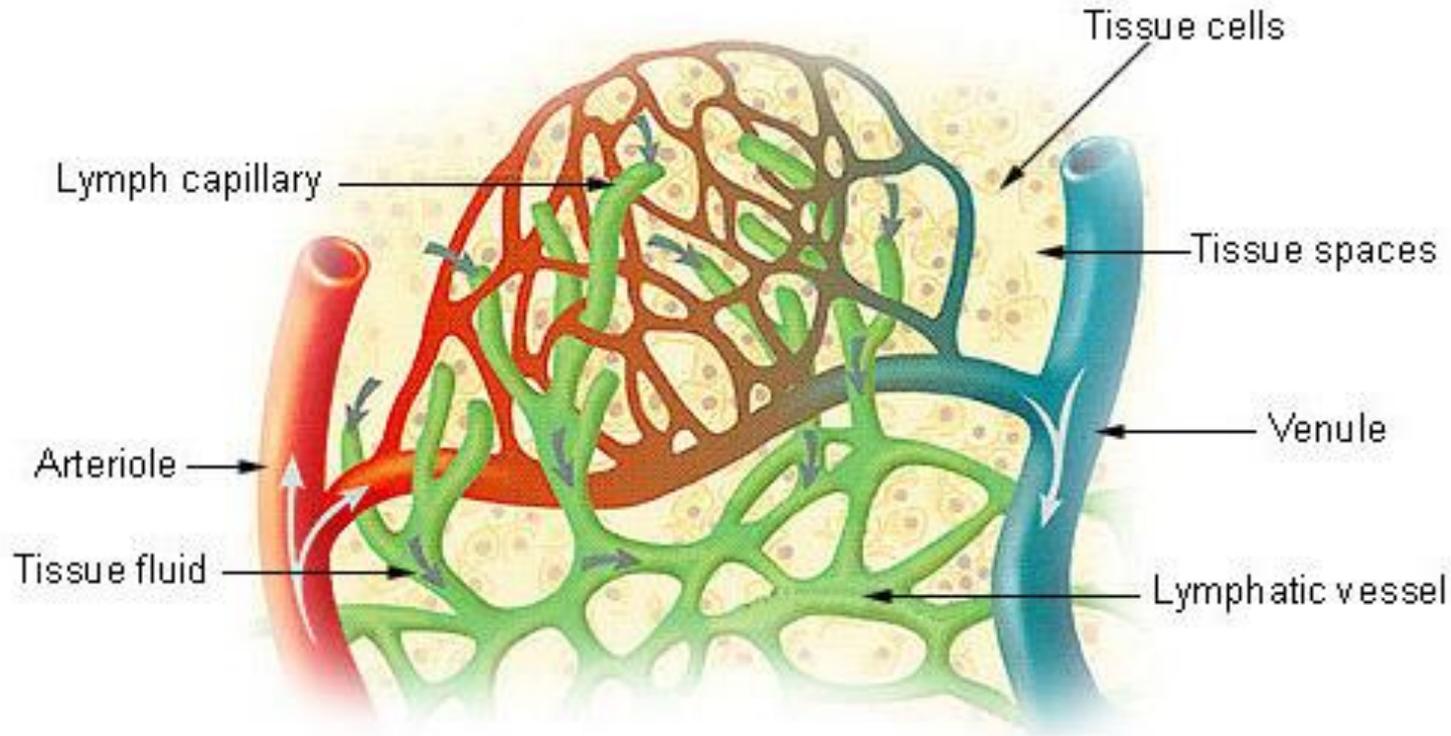


Diagram of the classic Starling model. Note that the concentration of interstitial solutes (orange) increases proportionally to the distance from the arteriole.

2) LYMPHATIC VESSELS

- ▶ Lymphatic vessels, unlike blood vessels, only carry fluid AWAY from the tissues. The smallest lymphatic vessels are the **lymph capillaries**, which begin in the tissue spaces as blind-ended sacs. Lymph capillaries are found in all regions of the body except the bone marrow, central nervous system, and tissues, such as the epidermis, that lack blood vessels. The wall of the lymph capillary is composed of endothelium in which the simple squamous cells overlap to form a simple one-way valve. This arrangement permits fluid to enter the capillary but prevents lymph from leaving the vessel.

Lymph Capillaries in the Tissue Spaces



The microscopic lymph capillaries merge to form lymphatic vessels. Small lymphatic vessels join to form larger tributaries, called lymphatic trunks, which drain large regions. Lymphatic trunks merge until the lymph enters the two lymphatic ducts. The right lymphatic duct drains lymph from the upper right quadrant of the body. The thoracic duct drains all the rest.

ACTION MOVES LYMPH

- ▶ Like veins, the lymphatic tributaries have thin walls and have valves to prevent backflow of blood.
- ▶ UNLIKE veins, there is no pump in the lymphatic system like the heart in the cardiovascular system. The pressure gradients to move lymph through the vessels come from the skeletal MUSCLE ACTION, respiratory movement, and CONTRACTION of smooth muscle in vessel walls.

3) LYMPHATIC ORGANS

- A. Lymph Nodes
 - B. Tonsils
 - C. Adenoids
 - D. Spleen
 - E. Thymus
- 

LYMPHATIC ORGANS

- ▶ Lymphatic organs are characterized by clusters of lymphocytes and other cells, such as macrophages, enmeshed in a framework of short, branching connective tissue fibers. The lymphocytes originate in the red bone marrow with other types of blood cells and are carried in the blood from the bone marrow to the lymphatic organs.
- ▶ When the body is exposed to microorganisms and other foreign substances, the lymphocytes proliferate within the lymphatic organs and are sent in the blood to the site of the invasion. This is part of the immune response that attempts to destroy the invading agent.

A) Lymph Nodes

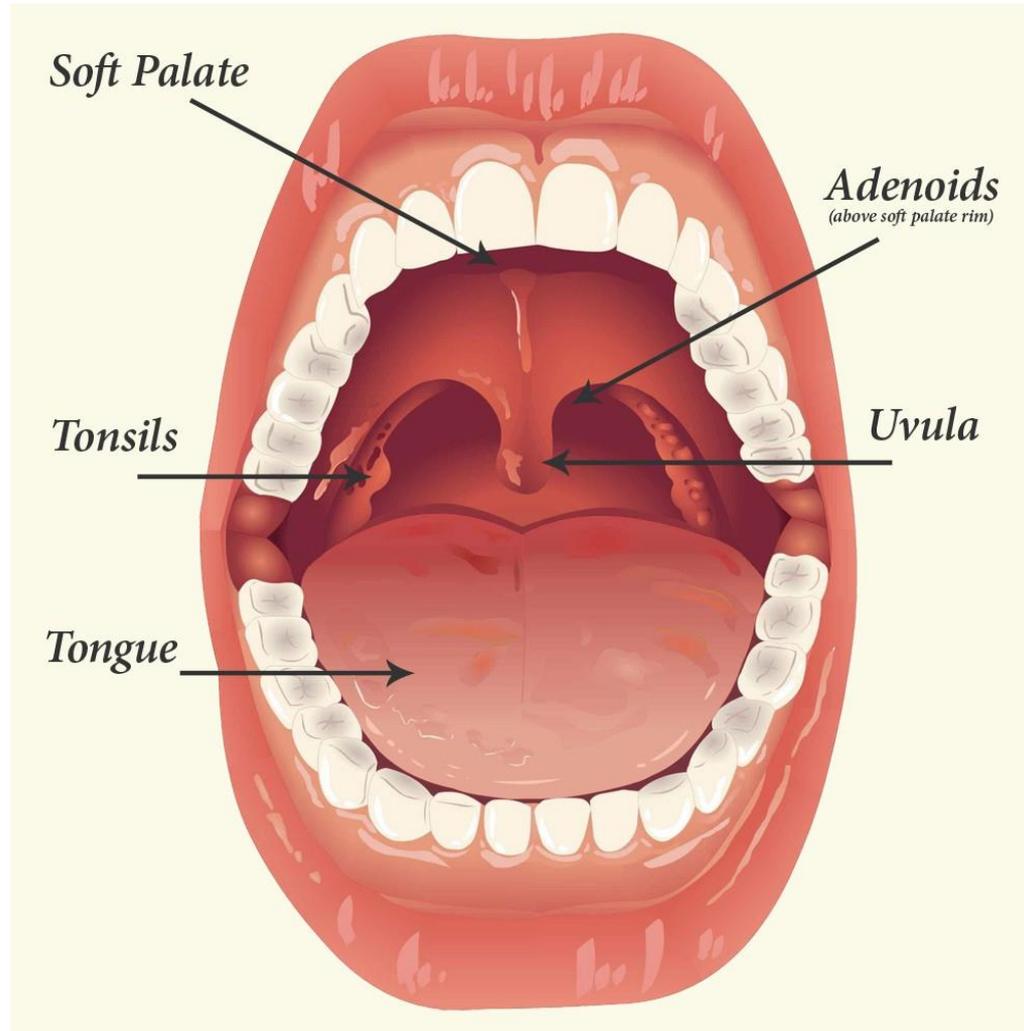
- ▶ Lymph nodes make **immune cells** that help the body fight infection. They also
- ▶ **Filter** the lymph fluid and remove foreign material such as bacteria and cancer cells. When bacteria are recognized in the lymph fluid, the lymph nodes make more infection-fighting white blood cells. This causes the nodes to swell. The swollen nodes are sometimes felt in the neck, under the arms, and groin.

NODES

- ▶ 500–600 **lymph nodes** distributed throughout the **body**, with clusters found in the underarms, groin, neck, chest, and abdomen.
- ▶ Each lymph node filters the fluid and substances picked up by the vessels that lead to it. Lymph fluid from the fingers, for instance, works its way toward the chest, joining fluid from the arm. This fluid may filter through lymph nodes at the elbow, or those under the arm. Fluid from the head, scalp, and face flows down through lymph nodes in the neck. Some lymph nodes are deep inside the body, such as between the lungs or around the bowel, to filter fluid in those areas. The lymph fluid slowly flows in from all around the body, making its way back to the chest. At the end of its journey, the filtered fluid, salts, and proteins are dumped back into the bloodstream.

B) Tonsils

C) Adenoids



B) Tonsils

C) Adenoids

- ▶ Important part of the immune system, producing antibodies that kill pathogens before they can spread to the rest of the body.
- ▶ Work by trapping germs coming in through the mouth and nose
- ▶ Covered by a layer of mucus and hairlike structures called **cilia**. The cilia work to push nasal mucus down your throat and into your stomach.
- ▶ After tonsil or adenoid removal, the researchers found a two- to three-times increase in diseases of the upper respiratory tract. They identified smaller increases in risks for infectious and allergic diseases. Following adenotonsillectomy, the risk for infectious diseases rose **17 percent**.

D) Spleen

- ▶ The spleen is the largest organ in the lymphatic system. It is an important organ for keeping bodily fluids balanced.
- ▶ The spleen is located under the ribcage and above the stomach in the left upper quadrant of the abdomen. A spleen is soft and generally looks purple. It is made up of two different types of tissue. The **red pulp** tissue filters the blood and gets rid of old or damaged red blood cells. The **white pulp** tissue consists of immune cells (T cells and B cells) and helps the immune system fight infection.
- ▶ Acts as a blood filter; it controls the amount of red blood cells and blood storage in the body, and helps to fight infection

D) Spleen, enlarged

- ▶ viral infections, such as mononucleosis
- ▶ bacterial infections
- ▶ parasitic infections, such as malaria
- ▶ metabolic disorders
- ▶ hemolytic anemia
- ▶ liver diseases, such as cirrhosis
- ▶ blood cancers and lymphomas, such as Hodgkin's disease
- ▶ pressure on or blood clots in the veins of the liver or spleen
- ▶ In many cases, there are **no symptoms** associated with an enlarged spleen,

E) Thymus

- Located behind sternum and between lungs; only active until puberty.
- After puberty, the thymus starts to slowly shrink and become replaced by fat.
- Thymosin is the hormone of the thymus. White blood cells called lymphocytes pass through the thymus, where they are transformed into T cells through progenitor cells.
- Once T cells have fully matured in the thymus, they migrate to the lymph nodes. The body uses T-cells help destroy infected or cancerous cells. T-cells created by the thymus also help other organs in the immune system grow properly.

E) Thymus

- ▶ It is part of the **lymphatic** system, along with the tonsils, adenoids and spleen
- ▶ **Endocrine** system.
- ▶ helping the body protect itself against **autoimmunity**.
- ▶ Myasthenia gravis occurs when the thymus is abnormally large and produces antibodies that block or destroy the muscles' receptor sites. This causes the muscles to become weak and easily tired.

OUTLINE

I. COMPONENTS

II. FUNCTION

III. PROTOCOL



II. – FUNCTION

- ▶ In comparison to the cardiovascular system the lymphatic system has not in the past been the focus of much research. However it's important role in the body's immune system has meant that it has increasingly become the focus of research in more recent times
- ▶ 4 PRIMARY FUNCTIONS

II – FUNCTION

- 1) **IMMUNE SYSTEM**, defense against invading microorganisms and disease.
 - a) **Filter** the lymph to remove microorganisms and other foreign particles.
 - b) Lymphatic organs contain **lymphocytes** that destroy invading organisms.

II. – FUNCTION

2) **DRAINAGE NETWORK** - keeps bodily fluid levels in BALANCE and defends the body against INFECTIONS.

It returns excess interstitial fluid to the blood. Of the fluid that leaves the capillary, about 90 percent is returned. The 10 percent that does not return becomes part of the interstitial fluid that surrounds the tissue cells. Small protein molecules may "leak" through the capillary wall and increase the osmotic pressure of the interstitial fluid. This further inhibits the return of fluid into the capillaries, and fluid tends to accumulate in the tissue spaces. If this continues, blood volume and blood pressure decrease significantly and the volume of tissue fluid increases, which results in edema (swelling). Lymph capillaries pick up the excess interstitial fluid and proteins and return them to the venous blood. After the fluid enters the lymph capillaries, it is called lymph.

II. – FUNCTION

3) **ABSORPTION OF FATS AND FAT SOLUBLE NUTRIENTS**

The lymphatic system enables the absorption of fats and fat-soluble vitamins from the digestive system and the subsequent transport of these substances to the venous circulation. The mucosa that lines the small intestine is covered with fingerlike projections called villi. There are blood capillaries and special lymph capillaries, called lacteals, in the center of each villus. The blood capillaries absorb most nutrients, but the fats and fat-soluble vitamins are absorbed by the lacteals. The lymph in the lacteals has a milky appearance due to its high fat content and is called chyle.

OUTLINE

I. COMPONENTS

II. FUNCTION

III. PROTOCOL

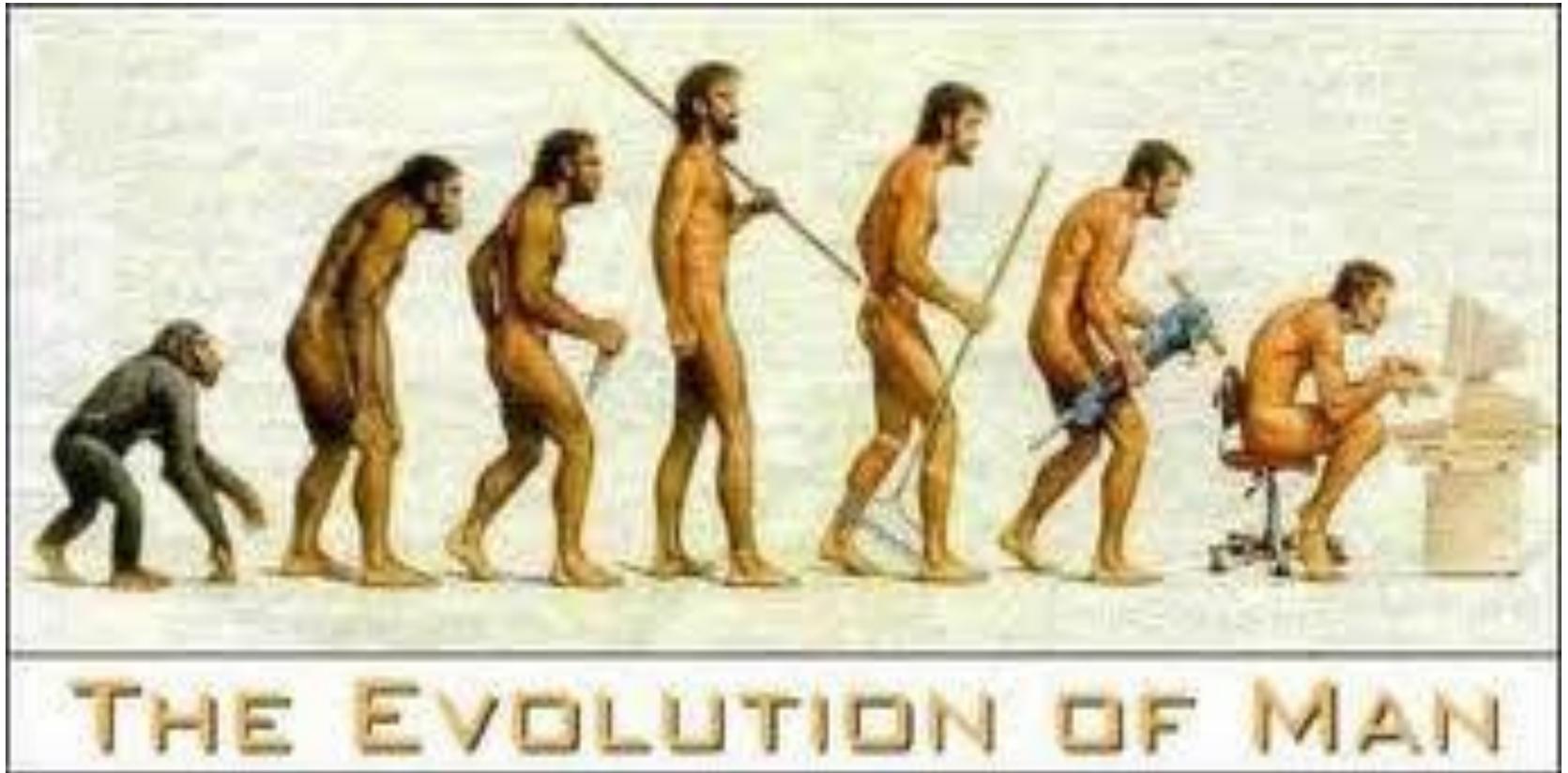


III. PROTOCOL

EXERCISE... MOVE YOUR BODY

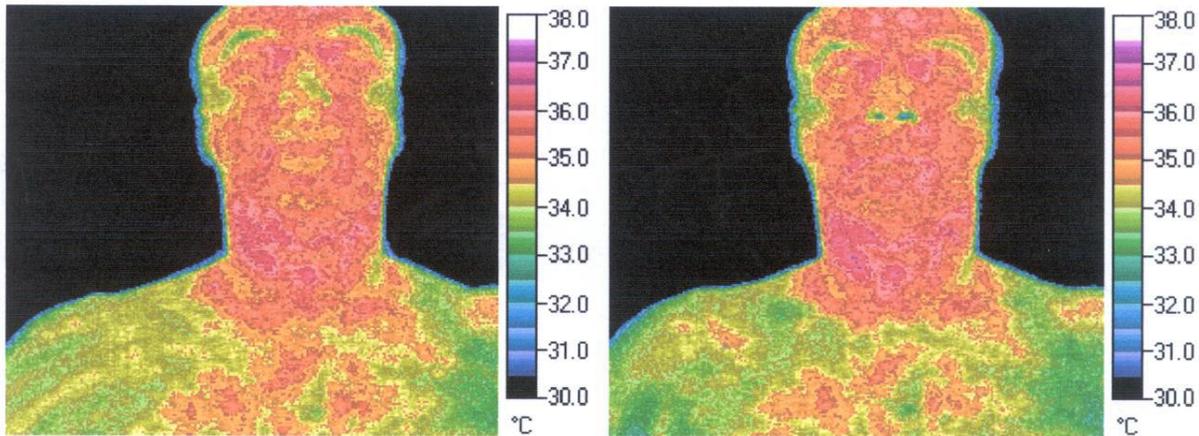
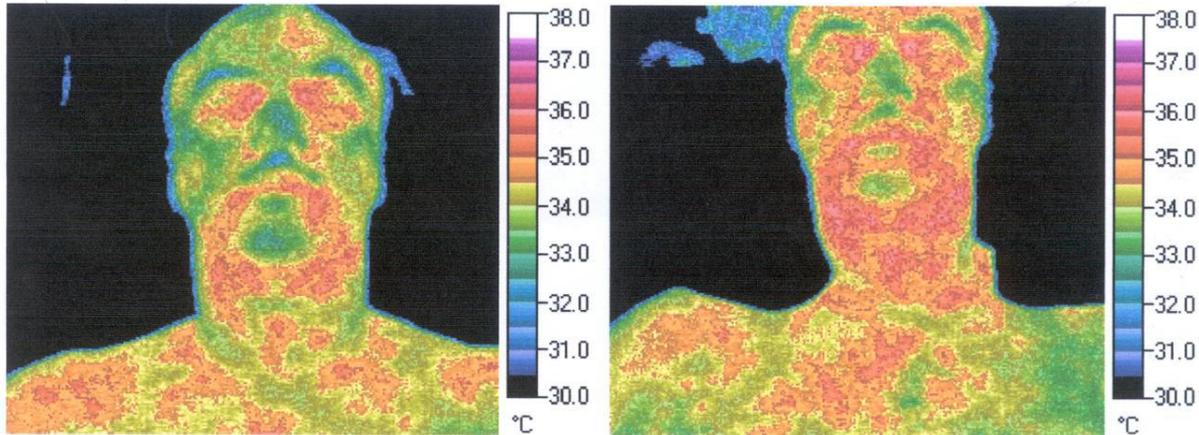
- If we just substitute word “**exercise**” with the word “**movement**” we would come to several interesting conclusions.
- In the many centuries in the past, majority of people rarely had any type of “exercise,” but they had regular MOVEMENT.
- What in the modern world do we have as opposite to movement?
- **SITTING!**
- Sit-Stand desk
- **SITTING IS A NEW SMOKING!**





THE EVOLUTION OF MAN

TESLA MACHINE (RIFE, LBG)



47 Minutes.

Client has Cervical Node Blockage.

NOTE: Increased blood flow to region.

TESLA MACHINE, PHOTOBIO-MODULATION

PATIENT: Male, 32 Yrs.

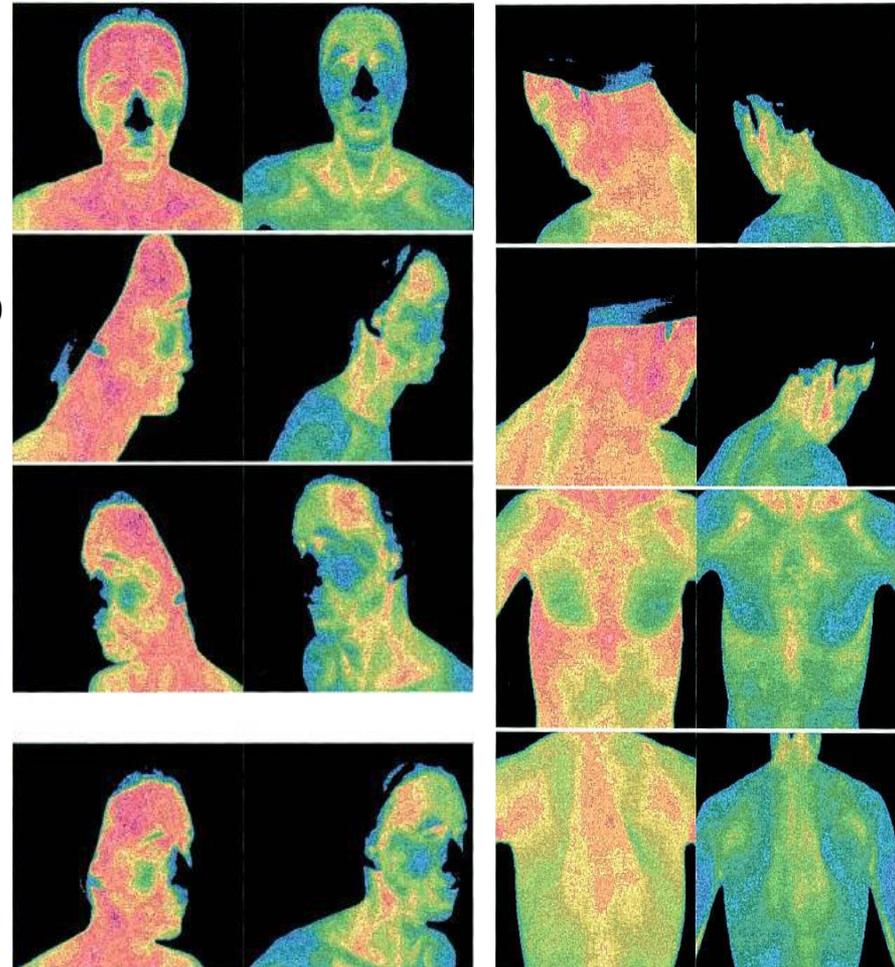
DIAGNOSIS: Black Fungus Infection of RT/LF lung

PROTOCOL: Use of ST8 6-8 hours daily for 10 Days; Patient on Chinese Herbs

RESULTS: Abatement of severe inflammation; Appetite returned; Able to Walk and breath without difficulty; Patient to MD for further consultation

6 MONTH FOLLOW-UP:

No visible signs of Lung Issue



SUPPLEMENTS

- ▶ INTENZYME FORTE
- ▶ KAPPAREST
- ▶ IAG
- ▶ Zn Zyme Forte
- ▶ Cytozyme SP
- ▶ Cytozyme Thy
- ▶ MSM/Mo Zyme Forte
- ▶ Carbamide Plus
- ▶ Selenomethionine
- ▶ NAC
- ▶ Medicinal mushrooms