

THE LYMPHATIC SYSTEM

(Collated by Michelle Wilkinson www.movingnaturally.co.uk)

The lymph (lymphatic fluid) is a clear watery fluid which moves more slowly than blood through vessels creating a delicate silvery network both just below skin (superficial) and deep in the body.

It flows in one direction from the body's periphery into its centre running parallel to the venous blood flow.

Lymph is created from intercellular or interstitial fluid that has drained out of cells and tissues.

Lymph has a higher concentration of proteins, fat and bacteria which are too big to pass through membrane walls of the venous capillaries. A protein may be an infection and the lymph can aid the breakdown of these toxins. Additionally, it can purify by clearing out excess fats.

Miniscule, blind-ended tubes called lymph capillaries draw in the lymph from the intercellular fluid surrounding cells and tissues and pass it into larger lymphatic vessels. The lymph capillary walls have tiny flaps that operate like one-way swing doors so there is no return to the body cells and tissues.

During embryonic development the lymph arises from the veins and grows to assist them drawing fluid from body cells and tissues to then be returned to the heart via the subclavian veins in the upper chest.

The lymph therefore becomes a secondary transport system maintaining a consistent volume of blood. Each day around 24 litres (42 pints) of fluid leaves the blood as it passes into the surrounding cells and tissues. 90% returns to the blood via capillaries, leaving 10% as lymphatic fluid which travels through its vessels back to the heart to restore the blood's lost fluid.

The lymph flow mainly depends on the kneading action of neighbouring skeletal muscles which alternatively contract and relax creating a muscular pump. The fluid is squeezed out of cells and tissues into and along the lymphatic vessels.

There is a secondary or tissue pump to support the lymph flow. This is found in the breathing movement of the diaphragm, the peristaltic movement of digestion and the pulsing of blood along vessels.

There is a large lymph channel called the thoracic duct which flows upward from the cisterna chyli a lymph reservoir at the level of the second lumbar vertebrae.

This lymph channel travels up the front of the spine and supports its posture integrating the body limbs with the centre.

The larger lymph vessels are interrupted at various sites by lymph nodes which act as filtering stations to remove pathogens.

The lymph nodes are the size of a small kidney bean 1-25mm (0.041-1 inch) across. They occur along the lymph vessels like beads on a string and found in groups near veins especially at the neck (cervical), armpits (axillary), groin (inguinal), elbows and knees.

A lymph node is surrounded by a tough capsule. The internal spaces are filled with a network of fibres which support macrophages and lymphocytes. These fibres slow down the lymph flow allowing the macrophages to engulf and destroy bacteria, viruses and debris while the lymphocytes either attack pathogens or disables them with antibodies.

Lymphocytes are formed in the blood marrow. They mature in the thymus, a two-lobed gland which lies above the heart. The lymphocytes become T-cells having been trained to be an effective part of the body's immunity. Afterwards they are posted to lymphatic organs, lymph and blood.

During infection the lymph nodes may swell up and become tender often referred to as swollen glands.

When the lymph nodes fail to filter the lymphatic fluid, this lymph collects in the vessels especially of the arms and legs, causing swelling referred to as lymphoedema.

Areas devoid of lymphatic vessels and nodes are the brain, spinal cord, bone marrow and structures without blood vessels which receive nutrition via diffusion like the cartilage and epidermis.

The lymph nodes, spleen, thymus gland and tonsils are called the lymphoid organs.

The 5 tonsils form a ring with two at the back of the mouth, two at the back of the tongue and one in the upper throat. They guard the entrance to the digestive and respiratory systems from bacteria carried in food and air. Bacteria is trapped in the tonsils and destroyed by its lymphocytes.