Dr. Vodder's Manual Lymph Drainage

A Practical Guide

Second Edition

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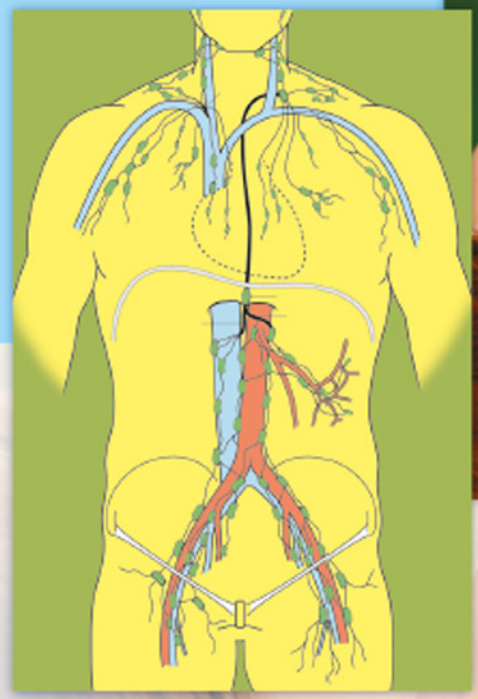

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Part V Historical Background

Preface

The content of this second edition was revised. The latest scientific findings of fundamental research in lymphology were implemented, for example, the evidence of lymph vessels in the meninges of mice.

As practitioners of this method, we must ask ourselves what clinical relevance these little steps that are made in fundamental research provide.

As a matter of fact—at least in Austria—the governing body of social security compiles metastudies, which keep questioning the clinical efficiency of manual lymph drainage and combined decongestive therapy. These metastudies keep talking about the small amount of evidence of the efficiency of manual lymph drainage. Further studies need to focus on proving and substantiating that manual lymph drainage therapy is an effective therapy. Only then medicine would be open to recognizing the importance of the method and accepting its effectiveness. Therapists could then count on continuous prescriptions for manual lymph drainage and would be able to provide proof of its effectiveness. The therapists' problem is that MDs know little about the lymph pathways of the skin vessel system and how Vodder's manual lymph drainage achieves its results by influencing the lymph vessel system of the skin.

Nothing has changed in regard to the practical aspects and execution of Dr. Vodder's manual lymph drainage as a whole-body treatment or in combination with physical decongestion therapy. Vodder's techniques are explained to perfection and must be executed precisely in order to achieve the established and desired results.

For the past 50 years, it has been a well-known fact (based on scientific research and proof) that a hastened execution of the techniques or an increased pressure will cause spasms in the lymph vessels. Vodder too emphasized this in his teachings and I vividly remember his lectures. I hope the therapists, who will use this book complementary to their studies, will truly enjoy this technique and recognize manual lymph drainage as a valuable addition to their therapeutic options.

I dedicate this book to my sons Dieter and Andreas as well as to Dieter's wife Maria. They truthfully carry on Vodder's life's work and the enthusiasm that their father had for this method.

Hildegard Wittlinger
Walchsee, Austria

Spring 2019

Part I

Theoretical Basics of Manual Lymph Drainage

I

1 Anatomy and Physiology of the Circulation of Blood

1.1 Blood

Blood can be regarded as a liquid tissue. It circulates in the body, driven by a pump, the heart. Our blood accounts for 7 to 8% of our body weight, which in a person of 70 kg (154 lb) body weight amounts to about 4.5 to 6 L of blood. Blood is made up of **blood plasma** and **blood cells** (erythrocytes, leukocytes, and thrombocytes; ▶**Fig. 1.1**).

Red blood cells (erythrocytes) develop like all other blood cells from pluripotent stem cells in the bone marrow (▶**Fig. 1.2**). Erythrocytes contain hemoglobin, which transports oxygen. They are not motile (i.e., they cannot move on their own), but are carried along in the bloodstream.

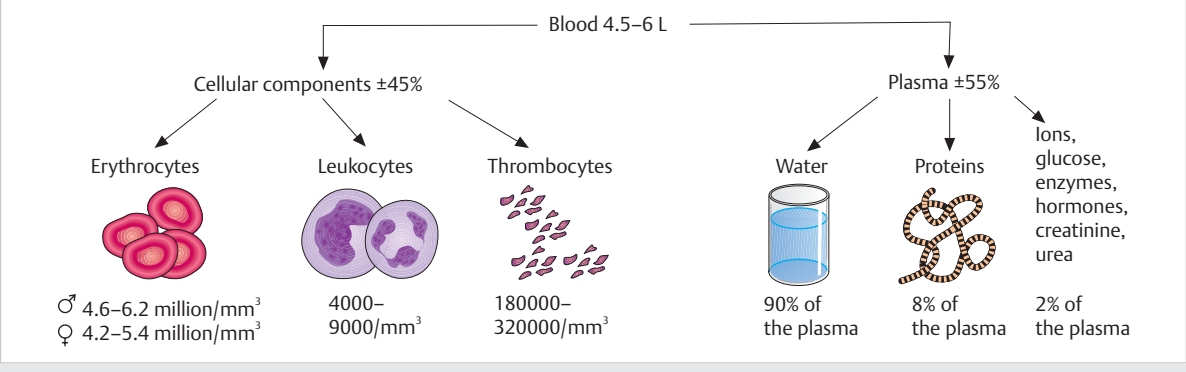

Fig. 1.1 Solid and liquid blood components.

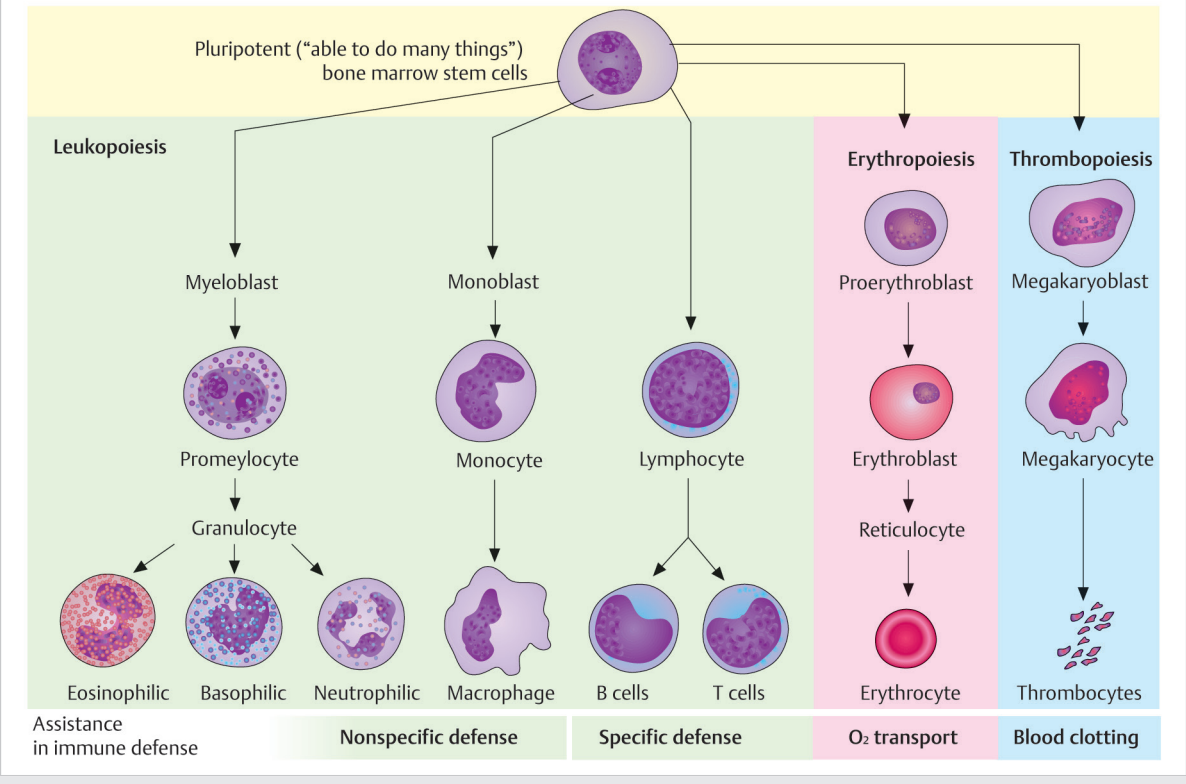

Fig. 1.2 Family tree of blood cells.

White blood cells (leukocytes) include granulocytes (neutrophilic, basophilic, and eosinophilic), lymphocytes, plasma cells, and monocytes.

Thrombocytes are blood platelets, which play an important part in blood coagulation.

Blood plasma contains dissolved organic and inorganic molecules. Albumins make up the majority of **plasma proteins**. They are metabolized in the liver and have a role as transporters, for example, of hormones. Like all plasma proteins, albumins are water soluble and are thus responsible for the colloid osmotic pressure. The immunoglobulins (also called antibodies) are the molecular front of the body's defense system. They are released into the blood by certain lymphocytes, called plasma cells.

Both blood and lymph contain **fibrinogen**, which has a role in coagulation. Examples of organic substances found in blood are lipids, lipid–protein compounds (lipoproteins), hormones, vitamins, amino acids, and bile pigments. "Organic substances" is the name given collectively to all molecules containing the carbon atom C, except for CO (carbon monoxide) and CO_2 (carbon dioxide).

Examples of inorganic substances are phosphate, iodine (I), iron (Fe), potassium (K), and sodium (Na).

The main task of blood is as a transporter. Oxygen is carried from the lungs directly to all tissues via the red blood corpuscles (erythrocytes), and carbon dioxide is carried back from the tissues to the lungs. The only structures excluded from this direct exchange are joint cartilage, a small section of the bone–tendon connection, and parts of the intervertebral disk. In addition, as a liquid medium, the bloodstream transports nutrients from the intestines to the tissues and metabolic waste to the organs of excretion.

1.1.1 Red Blood Cells (Erythrocytes)

Erythrocytes, which are non-nucleated, make up 99% of the corpuscular components of the blood. Their function is to transport oxygen, which bonds in the cell, to hemoglobin, the ferrous blood pigment.

Erythrocytes are formed in the bone marrow and have a life cycle of 120 days. They are broken down in the spleen. At maturity, they are 6 to 7 µm in size, which means they are larger than the diameter of the capillaries. Because they cannot move on their own, they have to be very pliable so that they can be pushed through the capillaries (▶ **Fig. 1.3**).

1.1.2 White Blood Cells (Leukocytes)

Leukocytes are not a uniform group of cells. Their three main groups comprise such differing cells as lymphocytes, granulocytes, and monocytes. Q 50

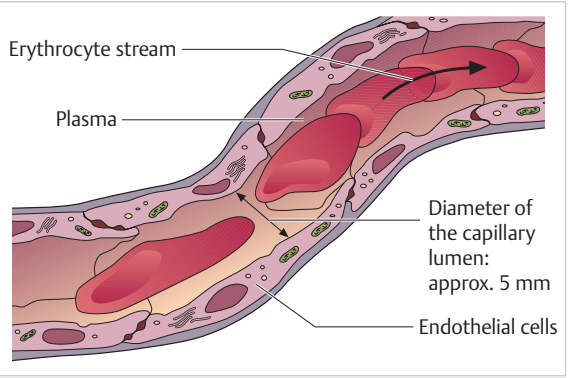

Fig. 1.3 Deformation of red blood cells as they pass through capillaries.

Granulocytes, which are nonspecific defense cells, make up 60% of leukocytes. They are divided into three groups (▶ **Fig. 1.4a–c**):

- Neutrophilic granulocytes (95%).
- Eosinophilic granulocytes (3%).
- Basophilic granulocytes (2%).

With a diameter of 10 to 17 µm, they are considerably larger than the erythrocytes. Granulocytes remain in the blood only for a short period of time, moving on from there to the tissues, especially the mucous membranes, where they fulfill their defense function by destroying bacteria through phagocytosis.

Approximately 30% of white blood cells are lymphocytes. They are 7 to 12 µm in diameter, between erythrocytes and granulocytes in size. Only 4% of lymphocytes circulate in the blood. Most of them are to be found in the lymphatic organs: spleen, thymus, lymphatic intestinal tissue, and lymph nodes.

Lymphocytes are subdivided into two groups: **T lymphocytes**, which are formed in the thymus, and **B lymphocytes**, formed in the bone marrow. These two groups have reciprocal effects. Certain T cells, the T helper cells, can stimulate B lymphocytes after an antigen has sensitized the latter. These B lymphocytes develop into plasma cells, which specialize in producing antibodies. T suppressor cells inhibit the immune response of B lymphocytes and other T cells. Specialized B lymphocytes represent the body's antigen memory. Q 39

Lymphocytes come in contact with an antigen in the lymph node. This contact sensitizes them and causes them to reproduce. They leave the lymph node through the efferent lymph vessels, enter the blood, enter the tissues, and then return to the lymph nodes. Lymphocytes spend most of their lifespan in lymph nodes or other lymphatic tissue and only hours (up to 24) in the blood. Q 11

Monocytes remain in the blood for a few days and travel from there to the tissues, where they reside as **macrophages** for months or even years. For this reason,

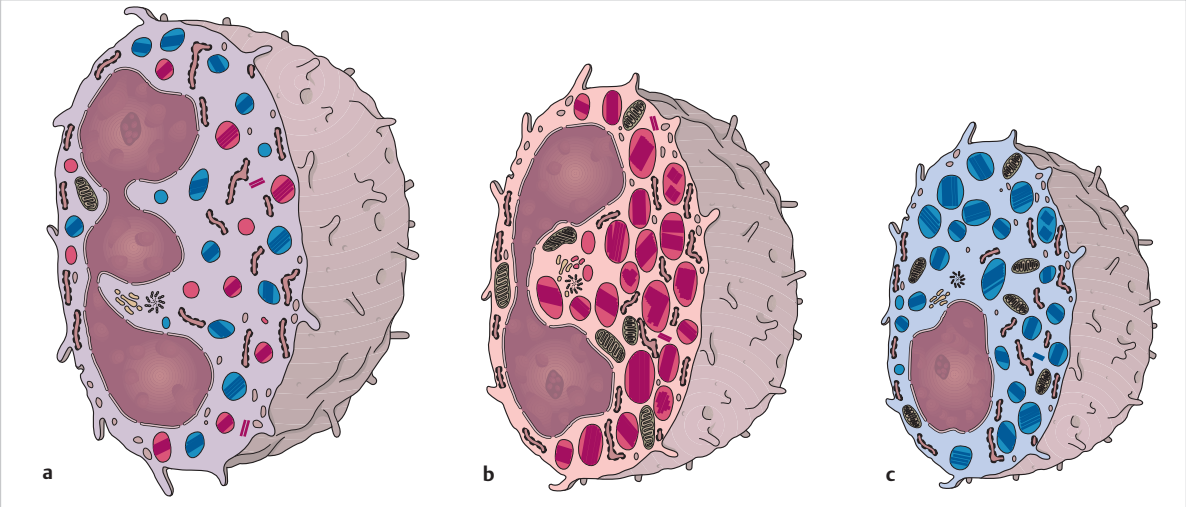

Fig. 1.4 Granulocytes: **(a)** neutrophilic; **(b)** eosinophilic; **(c)** basophilic.

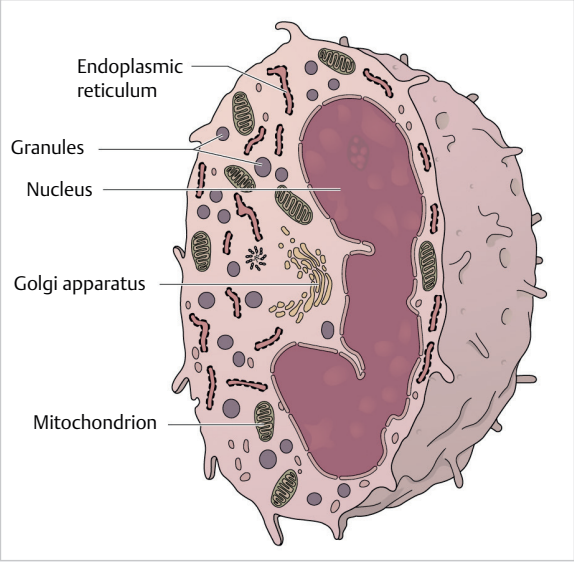

Fig. 1.5 Monocyte.

they are also called histiocytes (from the Greek *histion*, web, tissue). They have a nonspecific part in the defense system: they phagocytose cell debris and antigens. They are quite large (12–20 µm) and possess strong amoeboid motility (▶**Fig. 1.5**). Q 50

1.1.3 Blood Platelets (Thrombocytes)

Thrombocytes are small, flat, and round non-nucleated cells, 1 to 4 µm in diameter. Their lifespan is 9 to 12 days, during which time they remain in the blood. Their task is controlled coagulation of blood and wound sealing. If the endothelium of the inner vascular wall is damaged, platelets form a thrombus (clump) at the injury site.

Thrombocytes contain serotonin; serotonin causes vasoconstriction, which inhibits blood loss from the damaged vessel and promotes hemostasis.

1.2 Cardiovascular System

The cardiovascular system is made up of the heart and blood vessels. This system supplies oxygen and nutrients to all the cells in the body, and at the same time removes the waste products of metabolism, including carbon dioxide and substances excreted via the urinary system.

In the "greater" **circulatory system**, oxygen-rich blood coming from the lungs is pumped from the left cardiac ventricle, through the aorta, the arteries, the arterioles, and finally the capillaries into the periphery. Passing through the capillary system, the blood moves from the arterial into the venous system. From the venous part of the capillaries, the blood travels to the venules and veins. Propelled by various complementary mechanisms (valves that prevent the venous return), it travels to the right atrium of the heart, into the right ventricle (▶**Fig. 1.6**). The **muscle pump**, which is activated by any movement of the body, exerts pressure on the veins, particularly in the lower extremities.

The **venous valves** steer the blood in the desired direction. In addition, inspiration creates negative pressure in the thoracic cavity relative to the abdominal cavity, producing a suction that transports the venous blood toward