

Physiology, Water Balance Tobias A, Ballard BD, Mohiuddin SS. Publication Details Introduction The fluids of the body are primarily composed of water, which in turn contains a multitude of substances.[1] One such group of substances includes electrolytes such as sodium, potassium, magnesium, phosphate, chloride, etc. However, various clinical pathologies can alter the fluid composition and its constituents in the multiple compartments of the human body, which can have deleterious effects on our health and often require intensive interventions to monitor and maintain normal physiological conditions.[2] This article will primarily cover the physiologic composition of water in the human body, differentiate the various compartments in the body and their associated volumes and compositions, depict how to measure the different volumes, and delve into the clinical relevance associated with disturbances of the normal physiological conditions. For the sake of simplicity and to make the analysis of the intracellular space viable, the concept of a united intracellular "compartment" has been created as these collections have important unifying similarities such as location, composition, and behavior, which provides practical utility in the study of physiology.[4] The interstitial fluid consists of fluid, which lies in the space between and around bodily tissue. Although technically a "virtual" space, the interstitial fluid bathes all the cells in the body and links between intracellular fluid and the intravascular compartment. Examples of proteins include coagulation factors, immunoglobulins, albumin, and various hormones.[1] As the distribution of the fluid in the body and the substances found within is critical for the maintenance of intracellular and extracellular functions pivotal to survival, the body has developed mechanisms to control compartment composition tightly. Out of the extracellular fluid volume, 75% or 10.5L of the volume is present in the interstitial space, and 25% of that water is in the plasma, which is equivalent to 3.5L.[3] Each space works in unison with each other and has different functions paramount for normal physiological function. The ISF also contains the lymphatic system, which returns protein as well as excess ISF into the circulation.[5] Plasma is the only fluid compartment that exists as a real fluid collection all in one space. The ECFV is comprised of two spaces: The interstitial fluid volume (ISFV) and the plasma volume (PV). The body's fluid separates into two main compartments: Intracellular fluid volume (ICFV) and extracellular fluid volume (ECFV). Another group includes metabolites, such as oxygen, carbon dioxide, glucose, urea, etc. Cellular At a cellular level, the distribution of the various fluid compartments in the body is paramount for the maintenance of health, function, and survival. The intracellular fluid is comprised of at least ten separate minuscule cellular packages. It differs from the interstitial fluid by its higher protein content and its function in transportation. A third important group of substances contained within the water of our body, which includes proteins, most of which are vital for our existence. Of the 42L of water found in the body, two-thirds of it is within the intracellular fluid (ICF) space, which equates to 28L. ISF contains nutrients, oxygen, waste, chemical messengers, and contains a small amount of protein. For the average 70 kg man, 60% of the total body weight is comprised of water, equaling 42L. One-third of the total body water is the ECFV, which is equivalent to 14L.