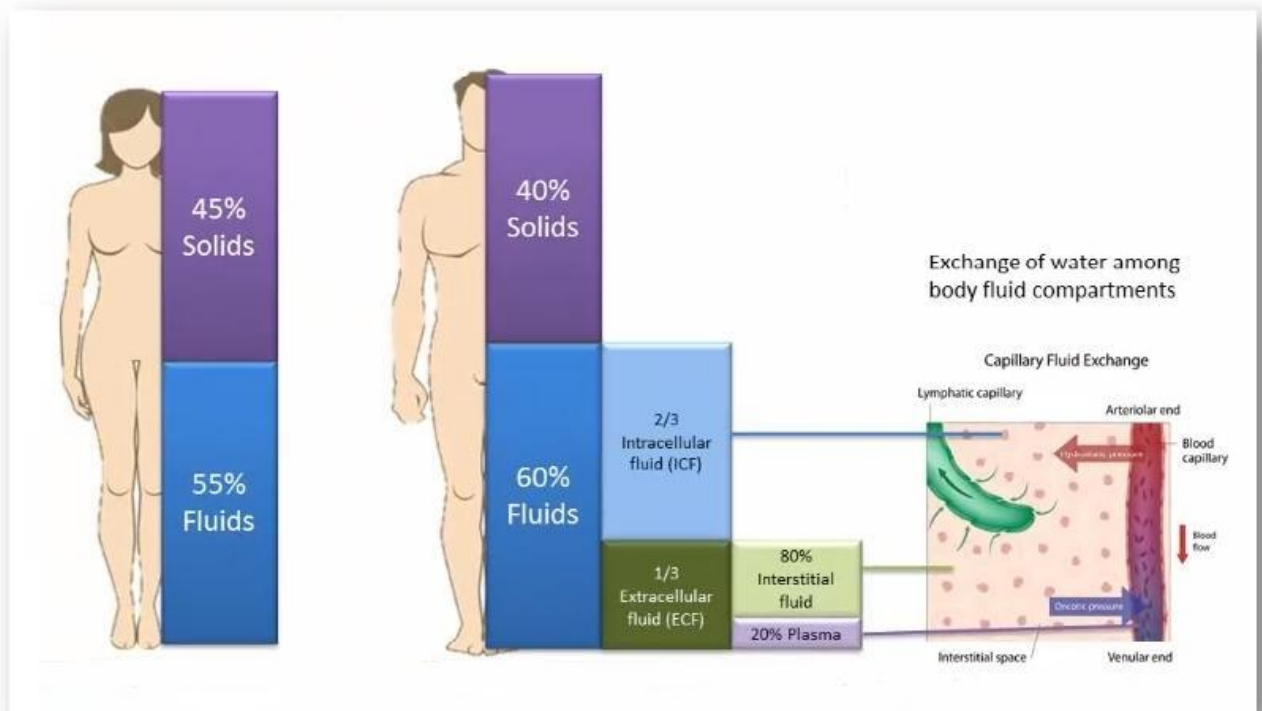


BODY FLUID COMPARTMENTS

The water in the human body can be lumped together into larger collections which can be categorised in a physiologically meaningful way. These collections are referred to as compartments. The major and broadest division separates the compartments into 2 the intracellular fluid (ICF) and the Extracellular Fluid based on which side of the cell membrane the fluid is situated. Approximate values for the size of the fluid compartments are shown on the diagram and listed in the table.



Body Fluid Compartments (70 kg male)			
	% of Body Weight	% of Total Body Water	Volume (Litres)
ECF	20	33	14
Plasma	5	8.0	3.5
Interstitial fluid	13	21.5	9.0
Transcellular	2	3.5	1.5
ICF	40	66	28
TBW	60%	100%	42 litres

Intracellular Fluids

Fluid compartments are an abstract idea and the concept of a single united intracellular compartment is not correct. In reality the ICF compartment is a virtual compartment" considered as the sum of the vast number of discontinuous minute collections in each individual cell. In total there are approximately 10^{14} separate tiny cellular compartments which total the ICF. The reason the ICF is thought of as a single body of fluid is that though not physically joined, the collections have extremely important unifying similarities which make the ICF concept of practical usefulness in physiology. These similarities are:

- The clear distinction between intracellular and extracellular compartments as separated by the cell membranes
- The ionic make-up of intracellular fluids and the resultant tonic effects (as discussed later in the chapter)

The convenience of discussing ICF as a single entity allows predictions to be made about what will happen with various interventions and within limits these are physiologically meaningful.

Extracellular Fluids

A similar conceptual idea applies to the Extracellular Fluid. The ECF is divided into several smaller compartments, the main ones being plasma and interstitial fluid but also the smaller compartments of the fluid of bone and dense connective tissue and transcellular fluid. Unlike in ICF these sub-compartments are distinguished by different characteristics as well as their different location.

Interstitial fluid (ISF) consists of all the fluid which lie in the interstices of all body tissues. Similar to ICF it is a 'virtual' fluid that exists in many separate small collections but is spoken about as though it was a pool of fluid of uniform composition in the one location. The ISF bathes all the cells in the body and is the link between the ICF and the intravascular compartment. Oxygen, nutrients, wastes and chemical messengers all pass through the ISF. ISF has the compositional characteristics of ECF but in addition it is distinguished by its lower protein concentration. Lymph is considered as a part of the ISF. The lymphatic system returns protein and excess ISF to the circulation.

Plasma is the only major fluid compartment that exists as a real fluid collection all in one location. It has much higher protein content than ISF and its high bulk flow (transport function). Blood volume is interesting in that it is a composite compartment containing ECF (plasma) and ICF (red cell water).

Transcellular fluid is a small compartment that represents all those body fluids which are formed from the transport activities of cells. It is contained within epithelial lined spaces. It includes CSF, gastrointestinal tract fluids, bladder urine, aqueous humour and joint fluid. It has an important role in specialised functions. The fluid fluxes involved with GIT fluids can be quite significant.

The fluid of bone & dense connective tissue is significant because it contains about 15% of the total body water. This fluid is mobilised only very slowly and therefore has little importance when considering the effects of acute fluid resuscitation.