Abstract:

The water contained in the body is divided amongst compartments of differing sizes and compositions. The dynamic balance across these volumes is an essential component of normal physiology. Here, the calculation of these volumes by measuring the dilution of markers able to permeate specific compartments is considered. Furthermore, the potential disadvantages to the approach are discussed. The differences in ionic concentration between intracellular and extracellular fluid are quantified and the effects of greater relative protein concentration within cells are also considered. To illustrate daily fluid balance in a healthy individual, a typical intake and output over 24 hours is quantified before consideration of iatrogenic contributions to this equilibrium. The way in which clinically administered fluids of varying compositions affect the fluid compartments is subsequently discussed. The endogenous processes contributing to volume homeostasis are then deliberated including the detection of fluid imbalance through intracellular and extracellular systems as well as the hypothalamic and renal effector mechanisms. Finally, the regulation of sodium is discussed with examination of the mechanisms controlling natriuresis and the reciprocity with potassium balance.