

Normal intracellular magnesium concentrations ranges from 5-20mmol/L. This amount of magnesium is further divided into free ionized form (1-5%) and bound form (95-99%) (Geiger & Wanner, 2012; Kupetsky-Rincon & Uitto, 2012).

One percent of total body magnesium exists in the extracellular space, specifically in RBCs and serum. Extracellular magnesium is divided into 3 main categories : Free/ionized form , protein bound form and anion bound form . Of these three forms, ionized magnesium has the greatest biological activity (Pasternak *et al.*, 2010; Blaszczyk & Duda-Chodak, 2013).

1.3 Magnesium biological activity

Being a major intracellular cation, magnesium plays a major role in intracellular functions; it acts as a counter ion for energy rich compounds and nucleic acids (Elin, 1988; Jahnen-Dechent & Ketteler, 2012).Furthermore, magnesium is a critical stabilizer of many enzymes including ATP-generating enzymes (Saris *et al.*, 2000; Swaminathan, 2003).ATP is a major intracellular energy source and is generally required in many essential functions inside cells, including glucose metabolism, fat , proteins , nucleic acid and coenzyme synthesis , muscle contraction and many other processes. Knowing that , magnesium is an essential factor in these cellular functions. Furthermore, magnesium contributes to regulation of vascular tone , heart rhythm, platelets function, cell proliferation , cell adhesion , transmembrane transportation of ions including sodium and potassium and bone formation. It is also essential for structural proteins and mitochondrial functions (Wester, 1987;Aikawa, 1981 and Jahnen-Dechent & Ketteler, 2012).