is promoted while tissue forming cells are in direct contact with bioglass materials (Palin et al., 2005). All these characteristics of bioglass coating result in better quality osseointegration and stability of dental implants for a longer functional life.

### 11.4.2 Cellular Response

In addition to bioactivity, it is essential that the coated bioglass material is biocompatible and supports cellular activities such as proliferation and functioning of osteoblasts (Hoppe et al., 2011). Bioglass has a chemical composition that supports the proliferation and functioning of osteoblasts. Moreover, the physical properties such as surface features and particle size may influence the bioglass performance. For instance, nanoscale bioglass materials improve physical properties such as surface morphology, surface energy, and wettability that ultimately facilitate protein interactions and subsequent cell adhesion and functionality for a prolonged period of time (Palin et al., 2005). Replacing conventional particles with nanoparticles in bioglass (45S5) increased the adsorption of total proteins on the surface (Misra et al., 2008). Hence, in addition to the chemical composition, the biological interaction of bioglass coating can be further promoted using nanoparticles and modifying surface properties.

### 11.4.3 Ion Dissolution and Osteogenesis

Ionic dissolution and concentration of various ions available in the bone forming environment is a vital factor for osteogenesis. Therefore, the bioglass coatings may act as a reservoir that leaches various ions in the biological environment required to control particular cellular functions (Hoppe et al., 2011). In order to enhance the bone growth and new bone formation, controlled release of ionic products is required upon biodegradation of bioglass. This includes a critical concentration of bioactive silica and calcium ions and other metallic ions from bioglass (Hoppe et al., 2011). The rate of ionic discharge can be monitored by the concentration and surface properties of bioglass. As a result, controlled ion releasing bioactive glasses facilitate the required concentration of specific metallic ions required for desired functioning, such as osteoblastic activity (strontium) for osteogenesis (Erol-Taygun et al., 2013). Furthermore, the bone adjacent to coated implant is of better quality, well organized, and mineralized.

In terms of dental implant coating, the formation of the bone layer is initiated by migration of ions (calcium, phosphate, sodium, and silica) toward tissue (alveolar bone) followed by the formation of a silica gel layer. The depletion of silicon initiates further migration of calcium and phosphate ions. A calcium-phosphorus layer is formed that stimulates osteoblasts to proliferate, stimulating the osteogenesis and formation of bone. Although nanoparticles containing bioglass materials are likely to enhance osteoconductivity (Misra et al., 2008), further in vivo and clinical studies are required to validate such claims.