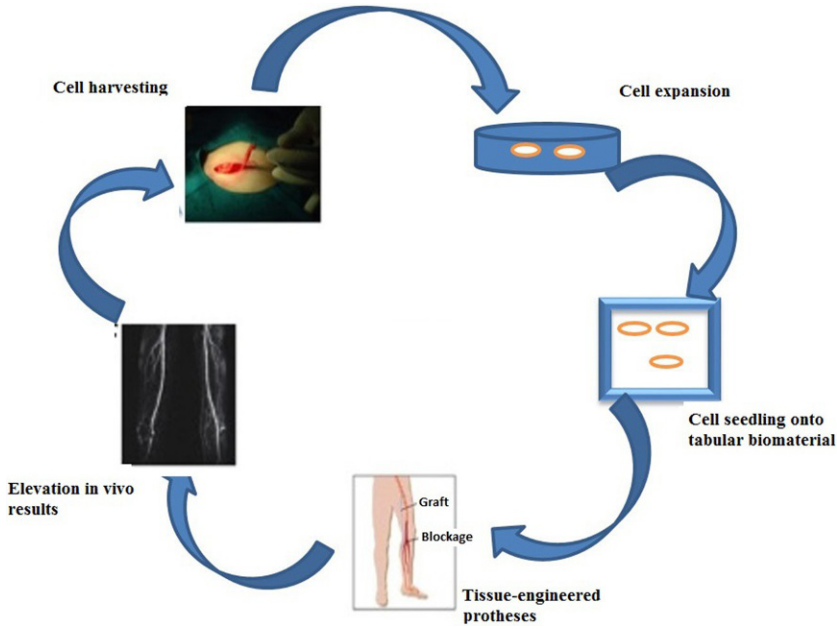

FIG. 5.2 Schematic diagram of tissue engineering.

networks are either combined together by physical or chemical crosslinks in a dispersant (water). The hydrogel mechanical properties can be altered in some cases to match those of soft tissues (Pek et al., 2010). The high water content and the highly porous nature of hydrogels permit facile transport of oxygen, nutrients, and other soluble factors (Nguyen and West, 2002). The hydrogels also have the ability to be administered via injection (Tan et al., 2009). Through injection, they can conform to the available space, allowing for uniform tissue regeneration. However, hydrogels have to be maintained in a hydrated state and, therefore, could possibly suffer from long-term stability issues in vivo (Chwalek et al., 2015). The most densely cross-linked gels can hinder the natural movement of cells (Włodarczyk-Biegun et al., 2016).

5.4.2 Solid Porous Scaffolds

The highly porous solid scaffolds can be prepared in a controlled and reproducible way that are compatible in structure and have long-term stability (Hayman et al., 2005). The high mechanical stability of solid scaffolds, having high porosity and pore interlinking, makes them ideal for highly interactive 3D cell cultures (Dhandayuthapani et al., 2011). The high porosity of such solid scaffolds allows the nutrients to go deeper and move freely through the structure without any resistance. The pores themselves can also limit the size of colonies, which when too large can cause cells to become necrotic (Dhandayuthapani et al., 2011).