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The potential impact of tissue engineering and regenerative therapies is so far-reaching that practising surgeons should be aware of the resulting opportunities to improve patient management. Several conditions that could benefit from this approach are of particular relevance to surgeons because they are closely involved in assessment and treatment (Table 4.1 Selected examples include the repair or replacement of injured or diseased cartilage, skin, pancreatic islets, bladder, intestine, heart tissue, arteries, larynx and bronchus. A longer term goal Burrill Bernard Crohn , 1884–1983, gastroenterologist, Mount Sinai Hospital, New Y ork, NY , USA, described regional ileitis in 1932. - in tissue engineering is the replacement of diseased whole organs such as the liver and kidney , although the technical challenges here are enormous.). Surgeons are integral to many of the multidisciplinary research teams currently undertaking translational research in this field and will play a vital role in the future delivery and

The role and range of materials and scaffolds for tissue • engineering The role and range of molecules and their delivery • The main challenges, safety issues and future directions • TABLE 4.1 Examples of tissues created by tissue engineering and conditions they may be used to treat. Tissue Conditions treated Skin Burns and skin defects after excision or trauma Eye Retinal and corneal disease Cardiac muscle Heart failure Heart valves Congenital and acquired valvular heart disease Cartilage and bone Degenerative and traumatic bone and joint disorders Trachea and bronchus Congenital and acquired stenosis and resection for malignancy Bladder Congenital bladder malformation and cystectomy Anal/bladder sphincter Incontinence Pancreatic islets Insulin-dependent diabetes Large blood vessels Atheromatous, aneurysmal and traumatic arterial disease Oesophagus Benign stenosis and resection for malignancy Small intestine Intestinal failure after surgical resection for Crohn’s disease, cancer or ischaemia

apeutic application, tissue engineering also has the potential to provide in vitro tissues that can be used to model human disease and to test therapeutic drugs for e ffi cacy and toxicity . However, it is important to emphasise that, while the potential benefit of cell therapy and tissue engineering is undeniable, there are many technical, regulatory and safety issues to be addressed for it to have wide clinical impact. Summary box 4.1 Tissue engineering and regenerative therapies /uni25CF /uni25CF /uni25CF

These have potential to provide: Treatment for a wide range of diseases Clinical applications – underpinned by translational research, delivery strategies and clinical evidence Models to test therapeutic ef /f_i cacy and toxicity

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