

Bioreactors provide controlled delivery of nutrients and biometric stimuli in order to influence cell growth, differentiation, and tissue formation. In this review, we will provide a critical overview of biomedical applications of bioreactors and discuss current trends and recent advances that promote the application of bioreactor technologies for single-cell manufacture, production of engineered tissue grafts, and drug screening. These advantages include (i) improved standardization and reproducibility, (ii) scale-up to larger, clinically relevant tissue grafts or cell expansion scales, (iii) superior functionality compared with 3D grafts cultured in tissue culture flasks, and (iv) improved systems for testing cell responses to a range of experimental parameters.