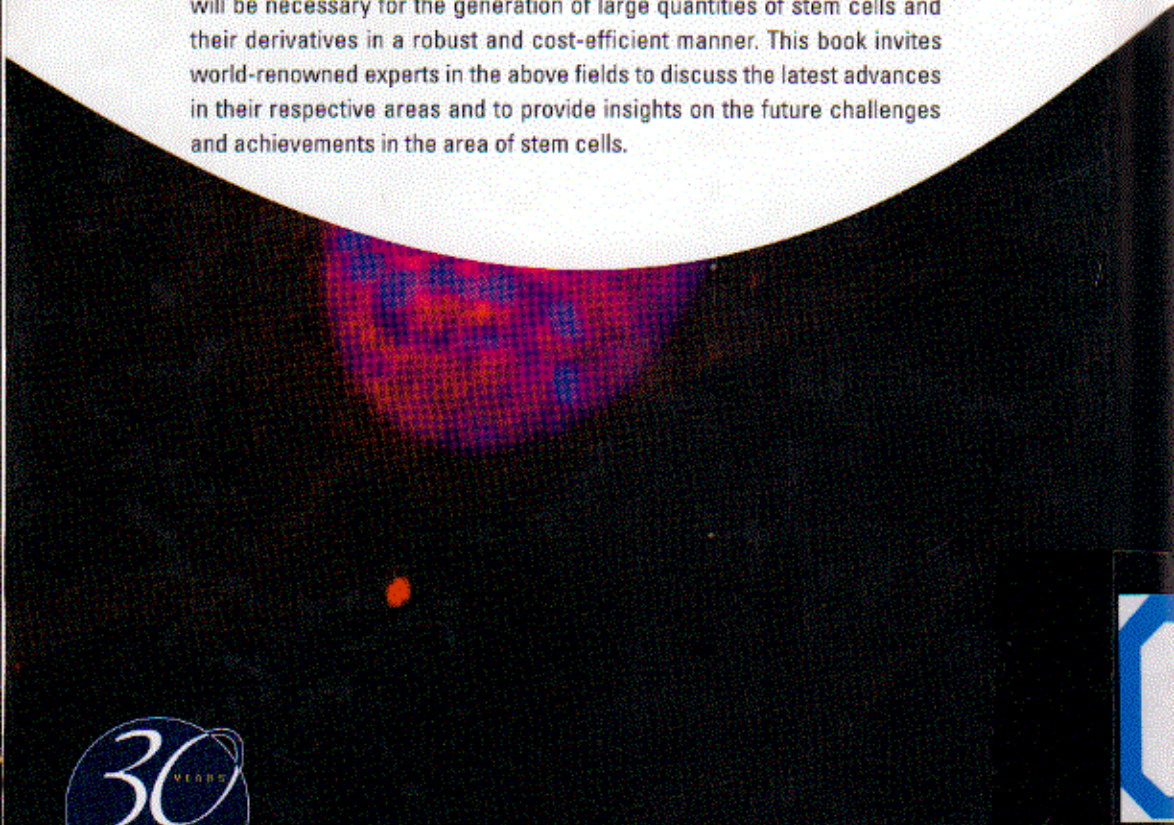
STEM CELLS

From Mechanisms to Technologies

Advances in stem cell biology and biotechnology have sparked hopes that therapies will soon be available for maladies which were considered incurable before. However, realization of the clinical potential of stem cells will require better understanding of stem cell physiology and the development of advanced technologies for their efficient differentiation in medically relevant quantities. Resolving these issues necessitates synergistic approaches from multiple fields. Systems biology can be employed to dissect the mechanisms regulating the genome and proteome of stem cells during self-renewal and commitment. Microfluidic platforms can be used to recreate aspects of the stem cell niche and obtain a better understanding of the interactions among stem cells and with their environment. The milieu of stem cells and their progeny can be shaped with appropriately designed biomaterials for the engineering of tissues to replace, reconstitute or regenerate damaged organs. To that end, enabling bioreactor technologies will be necessary for the generation of large quantities of stem cells and their derivatives in a robust and cost-efficient manner. This book invites world-renowned experts in the above fields to discuss the latest advances in their respective areas and to provide insights on the future challenges and achievements in the area of stem cells.



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ISBN-13 978-981-4317-70-2
ISBN-10 981-4317-70-5

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