

Jeffrey M. Gimble · Bruce A. Bunnell
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Adipose-Derived Stem Cells

Methods and Protocols

Third Edition



Humana Press

Adipose Derived Stem Cells Methods And Protocols

**Pawan Raghav,Rajesh Kumar,Anjali
Lathwal,Navneet Sharma**



Adipose Derived Stem Cells Methods And Protocols:

Adipose-Derived Stem Cells Jeffrey Gimble, Bruce Bunnell, Trivia Frazier, Cecilia Sanchez, 2024-03-13 Since the publication of the previous editions there has been increased focus on the use of adipose derived stromal stem cells ASC and stromal vascular fraction SVF cells in three dimensional hydrogel based scaffolds for the development of microphysiological systems MPS serving as in vitro humanized assays and alternatives to in vivo pre clinical animal models This third edition volume discusses of the latest technology and advancements in the field of human derived ASC and SVF The chapters in this book are organized into four parts Part One focuses on human ASC s isolation characterization and differentiation Part Two describes the isolation and characterization of ASC and SVF from canine feline and murine tissues Part Three looks at hydrogels scaffolds and microphysiological systems and Part Four talks about the new assays and applications using ASC Written in the highly successful Methods in Molecular Biology series format chapters include introductions to their respective topics lists of the necessary materials and reagents step by step readily reproducible laboratory protocols and tips on troubleshooting and avoiding known pitfalls Cutting edge and comprehensive Adipose Derived Stem Cells Methods and Protocols Third Edition is a valuable resource for both novice and experts researchers interested in learning more about this important and developing field

Scientific Principles of Adipose Stem Cells Lauren Kokai, Kacey Marra, J. Peter Rubin, 2021-08-19 Scientific Principles of Adipose Stem Cells provides readers with in depth and expert knowledge on adipose stem cells their developmental biologic origins foundational research on ASC signaling mechanisms and immunomodulatory properties and clinical insights into applications in regenerative medicine Topics covered include basic adipose stem cell developmental biology and mechanisms of regulating self renewal and activation in the stem cell niche important methods for isolation and characterizing ASCs and data on the impact on human demographics age sex BMI on ASC phenotype A section devoted to ASC biology ASCs for stem cell therapy and regenerative medicine and ASCs in tissue engineering applications are also included The book is written for scientists and clinicians who are broadly familiar with stem cells and basic cell biology principles and those seeking advanced information on adipose stem cells Coverage of basic adipose stem cell developmental biology maturation process during embryogenesis and mechanisms of regulating self renewal and activation in the stem cell niche Includes important methods for isolation and characterizing ASCs as well as known data any impact of human demographics age sex BMI on ASC phenotype An entire section dedicated to ASC biology additional sections will be devoted to ASCs for stem cell therapy and regenerative medicine as well as ASCs in tissue engineering applications

Skin Stem Cells Kursad Turksen, 2024-07-19 This updated edition explores techniques in identifying and characterizing various skin stem cells and generating skin like structures in vitro The goal of the book is to present exciting advances in skin biology in an effort to provide a better understanding of skin and eventually to allow us to regenerate skin with its original form and function Written for the highly successful Methods in Molecular Biology series

chapters include introductions to their respective topics lists of the necessary materials and reagents step by step and readily reproducible laboratory protocols and tips on troubleshooting and avoiding known pitfalls Authoritative and up to date *Skin Stem Cells Methods and Protocols Third Edition* serves as a valuable assemblage of protocols for researchers already working in the field and for those who now wish to newly embark on studies of skin stem cells *Adipogenesis* Michael S. Pepper, Melvin A. Ambele, 2025-05-30 This volume details protocols in Adipogenesis research such as stem cell line isolation gene expression obesity research and drug development Written in the highly successful *Methods in Molecular Biology* series format the chapters include brief introductions to the material lists of necessary materials and reagents step by step readily reproducible laboratory protocols and a Notes section which highlights tips on troubleshooting and avoiding known pitfalls Authoritative and cutting edge *Adipogenesis Methods and Protocols* aims to be comprehensive guide for researchers in the field

Biomaterials and Implant Biocompatibility Anișoara Cîmpean, Florin Miculescu, 2020-03-10 The scientific advances in life sciences and engineering are constantly challenging expanding and redefining concepts related to the biocompatibility and safety of medical devices New biomaterials new products and new testing regimes are being introduced to scientific research practices In order to provide clinically predictive results and to ensure a high benefit risk ratio for patients we need to optimize material and implant characteristics and to adapt performance and safety evaluation practices for these innovative medical devices Various characteristics related to materials and implant development such as raw materials composition implant surface morphology design geometry porosity and mechanical properties need to be thoroughly characterized before evaluating the biological performance of implants Furthermore with the increase of regulatory demands biological evaluation needs to ensure appropriate models and methods for each implant development stage This book is a result of the Special Issue of Materials on Biomaterials and Implant Biocompatibility which focused on the recent progress in development material testing and the biocompatibility and bioactivity evaluation of various materials including but not limited to bioceramics biopolymers biometals composite materials biomimetic materials hybrid biomaterials and drug device combinations for implants and prostheses with medical applications spanning from soft to hard tissue regeneration The book covers aspects ranging from investigations into material characterization to in vitro and in vivo testing for the assessment of biological performance of advanced novel biomaterials and implants Mesenchymal Stem Cells and Skeletal Regeneration Peter Giannoudis, Elena Jones, Xuebin Yang, Dennis McGonagle, 2013-02-20 *Mesenchymal Stem Cells and Skeletal Regeneration* covers our current understanding of the role of mesenchymal stem cells MSCs and other mesenchymal progenitors in skeletal regeneration encompassing bone cartilage and whole joint regeneration The expansion reflects developments in the field to include data on the use of MSCs in drug development growth factors scaffolds and biomechanical manipulations for skeletal trauma and diseases including osteoporosis and arthritis Written for an audience of clinicians and young researchers who are exposed to MSCs in their work this work summarizes recent findings

pertaining to the definition and characterization of MSCs in skeletal tissues and discusses the mechanisms of their actions in regeneration of bone in vivo The authors describe recent findings pertaining to the efficacy of MSC therapies in animal models and in human clinical trials and bring together literature showing that the ways MSCs are extracted expanded and implanted can considerably affect bone formation outcomes Finally it presents the latest knowledge on the nature of native MSCs in skeletal tissues which provide a platform for novel in situ tissue regeneration approaches for systemic bone disease such as osteoporosis Focuses specifically on the use of stem cells in skeletal tissue generation for a broad audience of stem cell cancer and bone biologists orthopedists oncologists and regenerative medicine specialists Provides a short historical detour and foundational information on founding concepts discoveries and personalities in MSC research Assists a new generation of scientists and clinicians in digesting the multitude of journal articles on the topic by providing easily absorbed and condensed foundational context

Xenotransplantation Shuji Miyagawa, 2017-07-12 It has been nearly 5 years since I edited the last version In this version the focus is on islet transplantation In addition interesting topics dealing with corneal and peripheral nerve transplantation and decellularization are covered Unfortunately clinical trials have not started in Japan the USA or Europe in the past 5 years On the other hand clinical trials were completed in many countries and so on inventory of human xenotransplantation practices IXA and HUG in collaboration with the WHO In addition in Japan clinical trials related to cell transplantation have been initiated and guidelines for xenotransplantation have been revised In the near future some clinical trials on xenotransplantation using genetically modified pigs or the microencapsulation of pancreatic islets will start

Methods of Adipose Tissue Biology Part B, 2014-02-11 This book is a must have for anyone interested in obesity or the physiology of white or brown adipose tissues It contains state of the art methods from researchers that are world leaders in this field Detailed lab protocols range from methods to visualize adipocytes and adipose tissues in humans and experimental models to convert stem cells into white and brown adipocytes in vitro to evaluate aspects of adipocyte metabolism to inducibly knock out genes in adipose tissues and to evaluate transcriptional control of adipogenesis on a global scale The study of adipose tissue goes hand in hand with our global effort to understand and reverse the epidemic of obesity and associated medical complications Contributors include leading researchers who have made tremendous contributions to our ability to investigate white and brown adipose tissues The wide variety of experimental approaches detailed within this volume including the evaluation of adipose tissue biology at the molecular biochemical cellular tissue and organismal levels

Regenerative Medicine and Stem Cell Biology Nagwa El-Badri, 2020-11-27 This textbook covers the basic aspects of stem cell research and applications in regenerative medicine Each chapter includes a didactic component and a practical section The book offers readers insights into How to identify the basic concepts of stem cell biology and the molecular regulation of pluripotency and stem cell development How to produce induced pluripotent stem cells iPSCs and the basics of transfection The biology of adult stem cells with particular emphasis on mesenchymal stromal cells and hematopoietic stem

cells and the basic mechanisms that regulate them How cancer stem cells arise and metastasize and their properties How to develop the skills needed to isolate differentiate and characterize adult stem The clinical significance of stem cell research and the potential problems that need to be overcome Evaluating the use of stem cells for tissue engineering and therapies the amniotic membrane The applications of bio nanotechnology in stem cell research How epigenetic mechanisms including various DNA modifications and histone dynamics are involved in regulating the potentiality and differentiation of stem cells The scientific methods ethical considerations and implications of stem cell research Stem Cells and Lineage Commitment Kursad Turksen,2023-11-07 This detailed volume explores a variety of techniques used to study lineage commitment in stem cells Further elucidation of the process that stem cells undergo on their way to becoming more specified cell types is vital for a more complete understanding of cell biology and overall physiology Written for the highly successful Methods in Molecular Biology series chapters include introductions to their respective topics lists of the necessary materials and reagents step by step and readily reproducible laboratory protocols as well as tips on troubleshooting and avoiding known pitfalls Authoritative and practical Stem Cells and Lineage Commitment Methods and Protocols serves as an ideal guide for experts and novices in the field of stem cell biology Musculoskeletal Ultrasound-Guided Regenerative Medicine Yasser El Miedany,2022-08-17 The book examines recent developments in regenerative medicine and the use of musculoskeletal ultrasound Musculoskeletal regeneration has become a prominent research topic no doubt due to the sociological and economic pressures imposed by the current ageing population The ever expanding role of regenerative medicine and the identification as well as characterization of stem cells have introduced a major paradigm shift in the field of musculoskeletal and sports medicine as well as orthopaedic surgery Whereas in the past diseased tissue was replaced with allograft material current trends in research revolve around regenerating damaged tissue Specifically regenerative medicine stands in contrast to the standard treatment modalities which impair the body's natural abilities to facilitate endogenous repair mechanisms such as anti inflammatory drugs or destructive modalities e g radiotherapy nerve ablation injections of botulinum toxin and surgical interventions that permanently alter the functioning of a joint bone or spine When compared to other allopathic options including knee and hip arthroplasty with a 90 day mortality rate of 0-7% regenerative medicine treatment modalities have a lower incidence of adverse events with a growing body of statistically significant medical literature illustrating both their safety and efficacy Focusing on the major values of regenerative medicine this book with its 21 chapters is expected to fill an important void in the current literature It will take that extra step to guide you in your day to day clinical practice Featuring contributions from a large international group of leaders in regenerative medicine and musculoskeletal ultrasonography this book is an authoritative reference for rheumatologists physiatrists sonographers radiologists physiotherapists and orthopaedic specialists *Stem Cells in Clinical Practice and Tissue Engineering* Rakesh Sharma,2018-05-02 Stem Cells in Clinical Practice and Tissue Engineering is a concise book on applied methods of stem cell

differentiation and optimization using tissue engineering methods These methods offer immediate use in clinical regenerative medicine The present volume will serve the purpose of applied stem cell differentiation optimization methods in clinical research projects as well as be useful to relatively experienced stem cell scientists and clinicians who might wish to develop their stem cell clinical centers or research labs further Chapters are arranged in the order of basic concepts of stem cell differentiation clinical applications of pluripotent stem cells in skin cardiac bone dental obesity centers followed by tissue engineering new materials used and overall evaluation with their permitted legal status

Freshney's Culture of Animal Cells Amanda Capes-Davis,R. Ian Freshney,2021-02-17 FRESHNEY S CULTURE OF ANIMAL CELLS THE NEW EDITION OF THE LEADING TEXT ON THE BASIC METHODOLOGY OF CELL CULTURE FULLY UPDATED TO REFLECT NEW APPLICATIONS INCLUDING IPSCS CRISPR AND ORGAN ON CHIP TECHNOLOGIES Freshney s Culture of Animal Cells is the most comprehensive and up to date resource on the principles techniques equipment and applications in the field of cell and tissue culture Explaining both how to do tissue culture and why a technique is done in a particular way this classic text covers the biology of cultured cells how to select media and substrates regulatory requirements laboratory protocols aseptic technique experimental manipulation of animal cells and much more The eighth edition contains extensively revised material that reflects the latest techniques and emerging applications in cell culture such as the use of CRISPR Cas9 for gene editing and the adoption of chemically defined conditions for stem cell culture A brand new chapter examines the origin and evolution of cell lines joined by a dedicated chapter on irreproducible research its causes and the importance of reproducibility and good cell culture practice Throughout the book updated chapters and protocols cover topics including live cell imaging 3D culture scale up and automation microfluidics high throughput screening and toxicity testing This landmark text Provides comprehensive single volume coverage of basic skills and protocols specialized techniques and applications and new and emerging developments in the field Covers every essential area of animal cell culture including lab design disaster and contingency planning safety bioethics media preparation primary culture mycoplasma and authentication testing cell line characterization and cryopreservation training and troubleshooting Features a wealth of new content including protocols for gene delivery iPSC generation and culture and tumor spheroid formation Includes an updated and expanded companion website containing figures artwork and supplementary protocols to download and print The eighth edition of Freshney s Culture of Animal Cells is an indispensable volume for anyone involved in the field including undergraduate and graduate students clinical and biopharmaceutical researchers bioengineers academic research scientists and managers technicians and trainees working in cell biology molecular biology and genetics laboratories

The 11th Edition of the International Meeting of the SPCE-TC: Advances in Stem Cells and Cell Therapies Susana Solá,Joana Paiva Miranda,2021-09-14

Computational Biology for Stem Cell Research Pawan Raghav,Rajesh Kumar,Anjali Lathwal,Navneet Sharma,2024-01-12 Computational Biology for Stem Cell Research is an invaluable guide for researchers as they explore HSCs and MSCs in

computational biology With the growing advancement of technology in the field of biomedical sciences computational approaches have reduced the financial and experimental burden of the experimental process In the shortest span it has established itself as an integral component of any biological research activity HSC informatics in silico techniques such as machine learning genome network analysis data mining complex genome structures docking system biology mathematical modeling programming R Python Perl etc help to analyze visualize network constructions and protein ligand or protein protein interactions This book is aimed at beginners with an exact correlation between the biomedical sciences and in silico computational methods for HSCs transplantation and translational research and provides insights into methods targeting HSCs properties like proliferation self renewal differentiation and apoptosis Modeling Stem Cell Behavior Explore stem cell behavior through animal models bridging laboratory studies to real world clinical allogeneic HSC transplantation HSCT scenarios Bioinformatics Driven Translational Research Navigate a path from bench to bedside with cutting edge bioinformatics approaches translating computational insights into tangible advancements in stem cell research and medical applications Interdisciplinary Resource Discover a single comprehensive resource catering to biomedical sciences life sciences and chemistry fields offering essential insights into computational tools vital for modern research **Sabiston**

Textbook of Surgery E-Book Courtney M. Townsend, 2021-01-08 For more than 80 years Sabiston Textbook of Surgery The Biological Basis of Modern Surgical Practice has been the go to text for trainees and surgeons at all levels of experience for definitive guidance on every aspect of general surgery As the oldest continuously published textbook of surgery in North America this fully revised 21st Edition continues to provide the key information essential teaching pearls and completely updated content needed to make the most informed surgical decisions and achieve optimal outcomes for patients Concisely written and evidence based throughout it covers the breadth of material required for certification and practice of general surgery highlighted by detailed full color intraoperative illustrations and high quality video clips Follows a clear consistent progression beginning with principles common to surgical specialties including fluid and electrolyte management metabolic support and wound healing Subsequent sections review the management of injury transplantation oncology breast endocrine and abdominal procedures Covers key topics such as emerging surgical technologies and devices regenerative medicine the latest concepts in cancer biology and treatments and evidence based management and treatment Emphasizes the most up to date minimally invasive techniques and the use of robotics when indicated Features more than 2 000 superb illustrations and intraoperative photographs and 25 procedural videos that facilitate quick comprehension of surgical techniques Includes more schematic diagrams summary tables boxes and algorithms that provide a rich resource for reviewing surgical techniques and preparing for in training and board exams Shares the expertise of dozens of new authors and includes two new chapters on robotic surgery and fetal surgery Contains fully updated content on topics encountered by general surgery residents in training as well as in depth coverage of subspecialty areas including head and neck thoracic vascular urology

neurosurgery pediatrics and gynecology Enhanced eBook version included with purchase Your enhanced eBook allows you to access all of the text figures and references from the book on a variety of devices

Food Molecular Microbiology Spiros Paramithiotis, Jayanta Kumar Patra, 2019-02-14 With the advances in the field of molecular biology new tools make it possible to conduct in depth studies in food microbial communities from a molecular perspective Information from genomic transcriptomic proteomic and metabolomic studies can be integrated through bioinformatic applications thereby improving our understanding of the interactions between biotic and abiotic factors and concomitantly the physiology of starter cultures spoilage and pathogenic microbiota Improvements in the speed accuracy and reliability of food quality and safety assessment have made the foundation stronger for future developments including the exploitation of gene networks and applications of nanotechnology and systems biology This book reviews all these developments provides an integrated view of the subject and helps in identifying areas of future development

Maternal-Fetal and Neonatal Endocrinology Christopher S. Kovacs, Cheri L. Deal, 2019-10-12 Maternal Fetal and Neonatal Endocrinology Physiology Pathophysiology and Clinical Management systematically examines the normal and abnormal endocrinology of the pregnant and lactating female and of the fetus and neonate This reference volume expands coverage of specific disorders and diseases beyond the current endocrinology content on the market which in most cases has a paragraph or no mention at all about pregnancy or aspects of fetal neonatal development Formalized source of maternal fetal endocrine physiology and pathophysiology Key reference for fellows and residents for rarer endocrine pathologies Integrated presentation of new molecular and genetic causes of endocrine disorders Bridges the experience knowledge gap of endocrinopathies rarely encountered in pregnancy

Oral and Maxillofacial Surgery Lars Andersson, Karl-Erik Kahnberg, M. Anthony Pogrel, 2010-09-07 Oral and Maxillofacial Surgery Oral and Maxillofacial Surgery Edited by Lars Andersson Karl Erik Kahnberg and M Anthony Pogrel Oral and Maxillofacial Surgery is a comprehensive reference for all trainees and specialists in oral and maxillofacial surgery oral surgery and surgical dentistry This landmark new resource draws together current research practice and developments in the field as expressed by world authorities The book s aim is to cover the full scope of oral and maxillofacial surgery incorporating recent technical and biological developments within the specialty It provides a uniquely international and contemporary approach reflecting the exciting developments of technique and instrumentation within this surgical field built on technical innovation and medical and dental research Oral and Maxillofacial Surgery coalesces impressively broad and deep coverage of this surgical specialty into a cohesive and readable resource identifying commonalities and shedding light on controversies through reasoned discussion and balanced presentation of the evidence The Editors are joined by over 50 international experts offering a truly global perspective on the full spectrum of issues in oral and maxillofacial surgery The book s coverage extends from basic principles such as patient evaluation dental anesthesia wound healing infection control and surgical instruments to coverage of the complex areas of dentoalveolar surgery oral pathologic lesions trauma implant

surgery dentofacial deformities temporomandibular joint disorders and salivary gland disorders Where relevant the book provides separate coverage of topics where practice differs significantly from region to region such as general anesthesia Comprehensive reference covering full scope of oral and maxillofacial surgery Covers state of art clinical practice and the basic principles that underpin it Promotes an intellectually and internationally inclusive approach to oral and maxillofacial surgery Nearly 100 expert contributors brought together under the aegis of a renowned international editorial team Richly illustrated with medical artwork and clinical images ALSO OF INTEREST Clinical Periodontology and Implant Dentistry Fifth Edition Edited by Jan Lindhe Niklaus P Lang Thorkild Karring ISBN 9781405160995 Textbook and Color Atlas of Traumatic Injuries to the Teeth Fourth Edition Edited by Jens Andreasen Frances Andreasen Lars Andersson ISBN 9781405129541

Hair & Scalp Disorders Book One Dr. G. K. Glen Alvin, Prof. Mike K. S. Chan, Antonio Sison, Maria Jasmin

Jamora, 2025-02-21 This textbook of trichology is a valuable resource for all students from undergraduate to postgraduate as well as clinicians It is comprehensive in its coverage of hair physiology and diseases with illustrations and pictures to make reading it an enjoyable experience This textbook fulfils the requirements of medical students with basic science issues At the same time clinicians will find it an ideal companion as its content is concise and easy to refer to while postgraduate students will benefit from its up to date data and facts from hair and scalp research The clinical chapters cover all common and rare diseases in all age groups The book incorporates various therapeutic modalities including integrative medicine cell therapy psychotherapy and conventional medicine The chapters are written in a simplified crisp practical and user friendly style with many illustrations and classical photographs exhibiting features of selected diseases Interest in trichology is developing rapidly with many doctors and aestheticians establishing exclusive trichology clinics The volume of patients concerned with hair condition and appearance is ever increasing The interest and enthusiasm in this subject continue to grow substantially Therefore all dermatology and aesthetic medicine stakeholders must furnish and update themselves in the field of hair and hair diseases Renowned authors with expertise in trichology have shared their knowledge and experience to make this book a success

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Table of Contents Adipose Derived Stem Cells Methods And Protocols

1. Understanding the eBook Adipose Derived Stem Cells Methods And Protocols
 - The Rise of Digital Reading Adipose Derived Stem Cells Methods And Protocols
 - Advantages of eBooks Over Traditional Books
2. Identifying Adipose Derived Stem Cells Methods And Protocols
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Adipose Derived Stem Cells Methods And Protocols
 - User-Friendly Interface
4. Exploring eBook Recommendations from Adipose Derived Stem Cells Methods And Protocols
 - Personalized Recommendations
 - Adipose Derived Stem Cells Methods And Protocols User Reviews and Ratings
 - Adipose Derived Stem Cells Methods And Protocols and Bestseller Lists
5. Accessing Adipose Derived Stem Cells Methods And Protocols Free and Paid eBooks
 - Adipose Derived Stem Cells Methods And Protocols Public Domain eBooks
 - Adipose Derived Stem Cells Methods And Protocols eBook Subscription Services
 - Adipose Derived Stem Cells Methods And Protocols Budget-Friendly Options

6. Navigating Adipose Derived Stem Cells Methods And Protocols eBook Formats
 - ePub, PDF, MOBI, and More
 - Adipose Derived Stem Cells Methods And Protocols Compatibility with Devices
 - Adipose Derived Stem Cells Methods And Protocols Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Adipose Derived Stem Cells Methods And Protocols
 - Highlighting and Note-Taking Adipose Derived Stem Cells Methods And Protocols
 - Interactive Elements Adipose Derived Stem Cells Methods And Protocols
8. Staying Engaged with Adipose Derived Stem Cells Methods And Protocols
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Adipose Derived Stem Cells Methods And Protocols
9. Balancing eBooks and Physical Books Adipose Derived Stem Cells Methods And Protocols
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Adipose Derived Stem Cells Methods And Protocols
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Adipose Derived Stem Cells Methods And Protocols
 - Setting Reading Goals Adipose Derived Stem Cells Methods And Protocols
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Adipose Derived Stem Cells Methods And Protocols
 - Fact-Checking eBook Content of Adipose Derived Stem Cells Methods And Protocols
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements

- Interactive and Gamified eBooks

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