

Cell Biology Of Tooth Enamel Formation Functional Electron Microscopic Monographs Monographs In Oral Science Vol 14

Cover -- Half Title -- Title -- Copyright -- Contents -- Chapter 1 Differentiation of Ameloblasts and its Regulation by Epithelial-Mesenchymal Interactions -- Chapter 2 The Cell Biology of Amelogenesis -- Chapter 3 Molecular Biology of the Amelogenin Gene -- Chapter 4 Biochemistry of the Developing Enamel Matrix -- Chapter 5 Role of the Extracellular Matrix in Enamel Development -- Chapter 6 Structure of Developing Enamel -- Chapter 7 Structure of Mature Enamel -- Chapter 8 Chemistry of Mature Enamel -- Chapter 9 Hereditary Defects of Enamel -- Chapter 10 The Chemistry of Dental Caries -- Chapter 11 Dental Fluorosis -- Index

Gain a deeper understanding of oral health with the definitive text in oral histology. Written by Dr. Antonio Nanci, a world-renowned leader in cell biology, the new ninth edition of Ten Cate's Oral Histology covers all the latest research and trends in oral histology, embryology, physiology, oral biology, and postnatal growth and development that is essential to success in oral health! Considered to be the standard in the field, this renowned text uses straightforward explanations and detailed, full-color micrographs, images, and illustrations to help you better understand even the most complex topics. Detailed histological and structural images help you differentiate the structures. Medical approach to histology helps you understand underlying biological events, and oral tissue repair and regeneration. Full-color format helps bring oral histology to life. Learning resources on the Evolve website include multiple-choice review questions with instant feedback, and interactive drag-and-drop exercises. NEW! Full-color micrographs, images, and 3D art enhance your understanding of key oral histology concepts. NEW! Commentary boxes highlight new and innovative research topics from leaders in the field. NEW! Updated content — including additional content on the nervous system in chapter four — has been added to keep you up to date with the latest information in the field.

Stem Cell Biology and Tissue Engineering in Dental Sciences bridges the gap left by many tissue engineering and stem cell biology titles to highlight the significance of translational research in this field in the medical sciences. It compiles basic developmental biology with keen focus on cell and matrix biology, stem cells with relevance to tissue engineering biomaterials including nanotechnology and current applications in various disciplines of dental sciences; viz., periodontology, endodontics, oral & craniofacial surgery, dental implantology, orthodontics & dentofacial orthopedics, organ engineering and transplant medicine. In addition, it covers research ethics, laws and industrial pitfalls that are of particular importance for the future production of tissue constructs. Tissue Engineering is an interdisciplinary field of biomedical research, which combines life, engineering and materials sciences, to progress the maintenance, repair and replacement of diseased and damaged tissues. This ever-emerging area of research applies an understanding of normal tissue physiology to develop novel biomaterial, acellular and cell-based technologies for clinical and non-clinical applications. As evident in numerous medical disciplines, tissue engineering strategies are now being increasingly developed and evaluated as potential routine therapies for oral and craniofacial tissue repair and regeneration. Diligently covers all the aspects related to stem cell biology and tissue engineering in dental sciences: basic science, research, clinical application and commercialization Provides detailed descriptions of new, modern technologies, fabrication techniques employed in the fields of stem cells, biomaterials and tissue engineering research including details of latest advances in nanotechnology Includes a description of stem cell biology with details focused on oral and craniofacial stem cells and their potential research application throughout medicine Print book is available and black and white, and the ebook is in full color

Much research has focused on the basic cellular and molecular biological aspects of stem cells. Much of this research has been fueled by their potential for use in regenerative medicine applications, which has in turn spurred growing numbers of translational and clinical studies. However, more work is needed if the potential is to be realized for improvement of the lives and well-being of patients with numerous diseases and conditions. This book series 'Cell Biology and Translational Medicine (CBTMed)' as part of SpringerNature's longstanding and very successful Advances in Experimental Medicine and Biology book series, has the goal to accelerate advances by timely information exchange. Emerging areas of regenerative medicine and translational aspects of stem cells are covered in each volume. Outstanding researchers are recruited to highlight developments and remaining challenges in both the basic research and clinical arenas. This current book is the fifth volume of a continuing series.

Written by dentists for dentists – authors who know exactly what students need for safe clinical practice Includes comprehensive coverage of the soft tissues of the oral region and skeletal structures of the head, including vasculature and innervation Contains topics not found in other titles – including tooth eruption morphology and the effects of aging on teeth and associated soft tissues Includes clear discussion of sectional and functional morphology – mastication, swallowing, and speech Addresses physical and chemical properties of the tooth structure – enamel, dentine, pulp and cementum Many chapters include Clinical Considerations which explore pathological findings relating to the topic as well as other areas of importance such as the use of local anaesthesia, TMJ disorders and malocclusion Explores bone structure and remodelling – including potential bone atrophy following tooth extraction, its relevance to orthodontic treatment and implantology, trauma and malignancy Rich with over 1000 images including schematic artworks, radiological images, electron-micrographs, cadaveric and clinical photographs all specially selected to make learning and recall as easy as possible Includes the use of mnemonics and emboldened key terms to aid recall On-line self-assessment module aids revision and self-testing Many topics now boxed to aid learning and rapid revision Explores recent areas of research including tissue engineering techniques, TMJ replacement and the discovery of new chromosomal abnormalities

Here, the editor has gathered a team of international experts to present the latest advances in the field of laser imaging

and manipulation techniques. The result is broad coverage of the interactions with biological samples to perform novel optical manipulation operations, both on the cellular and tissue levels. Of interest to physicists working and researching laser tissue mechanisms, cell biologists investigating new imaging and manipulation operation on the cellular level, medical doctors working with new laser therapies and diagnostic tools, as well as engineers developing new technologies in the field of optics and lasers.

Pediatric Bone is the first book to be published to deal exclusively with the biology and diseases of bone as they affect children. Rapid advances have been made in our understanding of the mechanisms and factors controlling the growth and development of bone, and these are discussed in detail in this book. Further, the various diseases of bone which are peculiar to children are highlighted and discussed in the light of our current knowledge with regard to the causation, clinical signs and treatment. The book is aimed to provide those clinicians interested in children's diseases and basic scientists with a comprehensive resource covering the various aspects of bone health and disease in children

Key Features

- * Deals exclusively with bone development and diseases of children and each chapter written by an
- * Fully referenced providing an appendix of usually difficult to find information on the investigation of pediatric bone disease and reference values
- * Covers both the physiology of bone and mineral homeostasis in children and diseases in one book
- * Includes a CD-ROM of images

The molecular mechanisms and protein species associated with the mineralization of mature dental enamel are active areas of research. This book focuses on specific areas of research including the structural chemistry, protein biochemistry and genetics of enamel development.

Dental and craniofacial treatments are actually based on advances in biomaterials, tissue engineering and nanotechnology sciences. These developments brought considerable improvements on biomaterials commonly used in dental clinics. However, there is still a medical need for innovative techniques and materials for a controllable and efficient regeneration/repair of damaged craniofacial tissues and teeth. The novel biomaterials, imaging techniques, diagnostic and technological tools may offer thrilling perspectives for alternative treatments in dentistry.

The study of stem cell biology is under intensive investigation. Because stem cells have the unique capability to self-renew and differentiate into one or several cell types, they play a critical role in development, tissue homeostasis and regeneration. Stem cells also constitute promising cell candidates for cell and gene therapy. The aim of this book is to provide readers and researchers with timely and accurate knowledge on stem cell biology and regenerative medicine. This book will cover many topics in the field and is based on conferences given by recognized scientists involved in the international master course on stem cell biology at Sorbonne Université in Paris.

Issues in Life Sciences—Cellular Biology / 2013 Edition is a ScholarlyEditions™ book that delivers timely, authoritative, and comprehensive information about Cells and Materials. The editors have built Issues in Life Sciences—Cellular Biology: 2013 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Cells and Materials in this book to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Life Sciences—Cellular Biology: 2013 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

The revised edition of this bestselling textbook provides latest and detailed account of vital topics in biology, namely, Cell Biology, Genetics, Molecular Biology, Evolution and Ecology . The treatment is very exhaustive as the book devotes exclusive parts to each topic, yet in a simple, lucid and concise manner. Simplified and well labelled diagrams and pictures make the subject interesting and easy to understand. It is developed for students of B.Sc. Pass and Honours courses, primarily. However, it is equally useful for students of M.Sc. Zoology, Botany and Biosciences. Aspirants of medical entrance and civil services examinations would also find the book extremely useful.

This widely acclaimed reference work gives a comprehensive survey of all significant human malformations and related anomalies from the perspective of the clinician. The anomalies are organized by anatomical system and presented in a consistent manner, including details of the clinical presentation, epidemiology, embryology, treatment and prevention for each anomaly. When known, the molecular or other pathogenetic basis for the malformation is given. Most anomalies are illustrated by photographs or drawings. Specific malformations are linked to syndromes through the extensive use of differential diagnosis tables. Over a decade has passed since the first edition of this book was published, and the revised edition fully incorporates the advances made in the field during the intervening years.. It reflects new understanding of human developmental biology that has emerged from molecular, cytogenetic, and biochemical studies; new observations by clinicians as well as enhanced diagnostic and prevention capacities; and more accurate and comprehensive epidemiology. By condensing much of the information presented in the first volume of the previous edition, and exercising rigorous editorial control, Drs. Stevenson and Hall and their contributors have managed to update the book while reducing its size to that of a single volume. All clinicians and scientists interested in birth defects, including pediatricians, geneticists, genetic counselors, obstetricians, and pediatric pathologists, will find this book to be an invaluable source of information.

Sequential and reciprocal interactions between oral epithelial and cranial neural crest-derived mesenchymal cells give rise to the teeth and periodontium. Teeth are vital organs containing a rich number of blood vessels and nerve fibers within the dental pulp and periodontium. Teeth are composed by unique and specific collagenous (dentin, fibrillar cementum) and non-collagenous (enamel) highly mineralized extracellular matrices. Alveolar bone is another collagenous hard tissue that supports tooth stability and function through its close interaction with the periodontal

ligament. Dental hard tissues are often damaged after infection or traumatic injuries that lead to the partial or complete destruction of the functional dental and supportive tissues. Well-established protocols are routinely used in dental clinics for the restoration or replacement of the damaged tooth and alveolar bone areas. Recent progress in the fields of cell biology, tissue engineering, and nanotechnology offers promising opportunities to repair damaged or missing dental tissues. Indeed, pulp and periodontal tissue regeneration is progressing rapidly with the application of stem cells, biodegradable scaffolds, and growth factors. Furthermore, methods that enable partial dental hard tissue repair and regeneration are being evaluated with variable degrees of success. However, these cell-based therapies are still incipient and many issues need to be addressed before any clinical application. The understanding of tooth and periodontal tissues formation would be beneficial for improving regenerative attempts in dental clinics. In the present e-book we have covered the various aspects dealing with dental and periodontal tissues physiology and regeneration in 6 chapters: 1. General principles on the use of stem cells for regenerating craniofacial and dental tissues 2. The roles of nerves, vessels and stem cell niches in tissue regeneration 3. Dental pulp regeneration and mechanisms of various odontoblast functions 4. Dental root and periodontal physiology, pathology and regeneration 5. Physiology and regeneration of the bone using various scaffolds and stem cell populations 6. Physiology, pathology and regeneration of enamel using dental epithelial stem cells

Mineralized Tissues in Oral and Craniofacial Science is a major comprehensive update on knowledge in the field of mineralized tissues in the oral and craniofacial region. Drs. McCauley and Somerman assembled an international team of researchers and clinicians, offering a global perspective on the current knowledge in this field. Basic and clinical correlates reinforce the significance of research to clinical diagnoses and therapies, written in a manner that lends easily to their use for case study teaching venues. Section 1 features the many aspects of bone in the craniofacial region, including embryology, cell biology, and stem cell biology. Section 2 focuses on teeth—tooth development, dentin, enamel, cementum, and tooth regeneration. Section 3 discusses the interaction between bones and teeth, including those associated with inflammatory processes, periodontal ligaments, biomechanics, and other impact factors—such as nutrition, metabolic bone diseases and therapeutic modalities. The novel approach of linking the basic principles of the cell and molecular biology of hard tissues to clinical correlates will appeal to readers at all levels of their research careers, both students and faculty; faculty interested in a comprehensive text for reference; and clinicians interested in the biologic aspects of bones and teeth.

Stem Cells, Craniofacial Development and Regeneration is an introduction to stem cells with an emphasis on their role in craniofacial development. Divided into five sections, chapters build from basic introductory information on the definition and characteristics of stem cells to more in-depth explorations of their role in craniofacial development. Section I covers embryonic and adult stem cells with a focus on the craniofacial region, while sections II-IV cover the development and regeneration of craniofacial bone, tooth, temporomandibular joint, salivary glands and muscle. Concluding chapters describe the current, cutting-edge research utilizing stem cells for craniofacial tissue bioengineering to treat lost or damaged tissue. The authoritative resource for dentistry students as well as craniofacial researchers at the graduate and post-graduate level, Stem Cells, Craniofacial Development and Regeneration explores the rapidly expanding field of stem cells and regeneration from the perspective of the dentistry and craniofacial community, and points the way forward in areas of tissue bioengineering and craniofacial stem cell therapies.

Histology and Cell Biology: An Introduction to Pathology uses a wealth of vivid, full-color images to help you master histology and cell biology. Dr. Abraham L. Kierszenbaum presents an integrated approach that correlates normal histology with cellular and molecular biology, pathology, and clinical medicine throughout the text. A unique pictorial approach—through illustrative diagrams, photomicrographs, and pathology photographs—paired with bolded words, key clinical terms in red, and clinical boxes and "Essential Concepts" boxes that summarize important facts give you everything you need to prepare for your course exams as well as the USMLE Step 1. Access to studentconsult.com, with USMLE-style multiple-choice review questions, downloadable images, and online only references. Easily find and cross-reference information through a detailed table of contents that highlights clinical examples in red. Review material quickly using pedagogical features, such as Essential Concept boxes, bolded words, and key clinical terms marked in red, that emphasize key details and reinforce your learning. Integrate cell biology and histology with pathology thanks to vivid descriptive illustrations that compare micrographs with diagrams and pathological images. Apply the latest developments in pathology through updated text and new illustrations that emphasize appropriate correlations. Expand your understanding of clinical applications with additional clinical case boxes that focus on applying cell and molecular biology to clinical conditions. Effectively review concepts and reinforce your learning using new Concept Map flow charts that provide a framework to illustrate the integration of cell-tissue-structure-function within a clinical-pathology context.

The deposition of calcium-containing salts is a widespread phenomenon in both the plant and animal kingdoms. Its occurrence suggests a generalized biological adaptation to environments rich in calcium. Indeed, the Archaean ocean was rich in calcium carbonate, and traces of ancient organisms have been found in lime stones estimated to be about 2.7 billion years old. The fundamental nature of biological calcification makes it a subject of interest not only to the student of calcium metabolism and skeletal physiology, but also to biologists in general. As in many areas of biological science recent progress in this field has been rapid, and no attempt was made here to cover all the biological systems in which calcification is an important facet of the organisms' method of operation. Calcification is approached in this volume at the levels of the cellular sites and molecular mechanisms that are involved in this process. The ultrastructural and chemical features of the cells and their products which are associated with calcification are emphasized in several chapters. The editor, in inviting contributions from authors, intended that collectively the chapters should convey a sense of the ubiquitous and essential nature of the role of calcification in several phyla of the plant and animal kingdoms. The researchers were biochemists, physical chemists, cell biologists and physiologists; some represented medicine and dentistry; all were interested in calcification.

In this field there has been an explosion of information generated by scientific research. One of the beneficiaries of this has been the study of morphology, where new techniques and analyses have led to insights into a wide range of topics. Advances in genetics, histology, microstructure, biomechanics and morphometrics have allowed researchers to view teeth from alternative perspectives. However, there has been little communication between researchers in the different fields of dental research. This book brings together overviews on a wide range of dental topics linking genes, molecules and developmental mechanisms within an evolutionary framework. Written by the leading experts in the field, this book will stimulate co-operative research in fields as diverse as paleontology, molecular biology, developmental biology and functional morphology.

Stem cell technology is moving forward at a tremendous rate. Recent discoveries have surprised even the most expert researchers. While every piece of new data broadens the current knowledge and contributes to this moving forward, the new data also serve as paradigm shifters of fundamental knowledge of cell biology. While the question 'What is a Stem Cell' may now seem to basic to even discuss, there are still some discrepancies, however, between groups in terms of their functional roles. Teeth develop from the ectoderm of the first branchial arch and the ectomesenchyme of the neural crest. Deciduous teeth start to form between the sixth and eighth weeks, and permanent teeth begin to form in the twentieth weeks. Several studies have demonstrated that the pulp from both adult teeth and deciduous

teeth contains dental pulp stem cells. Several factors have made them very attractive as a model system for many researchers; they are multipotent, ethically and non-controversially available in large numbers, immuno-compatible, developmentally primitive, easy to isolate and have high expansion potential in vitro. However, many controversies still exist in the field. There are several unanswered questions in the biology of dental pulp and odontoblasts. This new volume in the SpringerBriefs in Stem Cells series presents an evaluation of stem cells from human dental pulp as a reliable stem cell source for cell-based therapy to stimulate tissue regeneration.?

Fossils are essential to the reconstruction of the evolution of life and episodes in Earth history. Fossil skeletal material serves as the repository of chemical data widely used in the reconstruction of the Earth's climate-ocean system at various time scales. Knowledge of biomineralization - the processes associated with the formation of mineralized biological structures - is essential to properly evaluate data derived from fossils. Additionally, knowledge of biomineralization is critical to the understanding of major events in the evolution of faunas, such as the original appearance of skeletons and some major extinction events. This is the first book to concentrate on aspects of biomineralization through Earth history. The book emphasizes skeletal formation and fossilization in a geologic framework in order to understand evolution, relationships between fossil groups, and the use of biomineral materials as geochemical proxies for understanding ancient oceans and climates. Approaching the subject from this viewpoint allows the authors to link the biotic, physical, and chemical realms. The focus is on shells and skeletons of calcareous organisms, although the broader impacts of these processes on other elements are also addressed, especially their roles in the global chemical cycles of carbon and silicon. The book explores the fine structures and mode of growth of the characteristic crystalline units, taking advantage of the most recent physical methodological advances. It is richly illustrated and will be of great interest to advanced students and researchers in paleontology, Earth history, evolution, sedimentary geology, geochemistry, and materials science.

International Review of Cytology presents current advances and comprehensive reviews in cell biology--both plant and animal. Articles address structure and control of gene expression, nucleocytoplasmic interactions, control of cell development and differentiation, and cell transformation and growth. Authored by some of the foremost scientists in the field, each volume provides up-to-date information and directions for future research.

This book provides a detailed update on our knowledge of dental pulp and regenerative approaches to therapy. It is divided into three parts. The pulp components are first described, covering pulp cells, extracellular matrix, vascularization and innervation as well as pulp development and aging. The second part is devoted to pulp pathology and includes descriptions of the differences between reactionary and reparative dentin, the genetic alterations leading to dentinogenesis imperfecta and dentin dysplasia, the pulp reaction to dental materials, adverse impacts of bisphenol A and the effects of fluorosis, dioxin and other toxic agents. The final part of the book focuses on pulp repair and regeneration. It includes descriptions of various in vitro and in vivo (animal) experimental approaches, definition of the pulp stem cells with special focus on the stem cell niches, discussion of the regeneration of a living pulp and information on new strategies that induce pulp mineralization.

The 'all-in-one' solution to mastering basic sciences in preclinical dentistry Basic Sciences for Dental Students is a cutting edge textbook specifically designed to support the needs of early years undergraduate dental students. Written by leaders in dental education and active oral and dental researchers involved with student assessment, the text explains the basic science that underpins the dental curriculum in undergraduate dental courses worldwide. Specifically related to dentistry and future clinical practice, chapters cover all of the introductory subjects that students need to know – biomolecules, cell biology, tissues of the body, cardiovascular, circulatory and pulmonary systems, the nervous system, immunology, oral microbiology, pathology, head and neck anatomy, tooth development, craniofacial development, saliva, and dental materials. Key features: Provides the basic science that underpins the early years of a dental curriculum Specifically tailored towards dentistry and future clinical practice Written by leaders in dental education and active oral and dental researchers Includes learning objectives and clinical relevance boxes throughout Self-assessment questions and downloadable figures are hosted on a companion website Basic Sciences for Dental Students is an indispensable resource for undergraduate dental students, especially those in the early years of their studies. It is also a useful revision tool for postgraduate MJDF and MFDS examinations and overseas candidates sitting their OREs.

Cell Biology of Tooth Enamel Formation Functional Electron Microscopic Monographs S Karger Ag Cell Biology of Tooth Enamel Functional Electron Microscopic Monographs Tooth Enamel: Frontiers in Mineral Chemistry and Biochemistry, Integrative Cell Biology and Genetics Frontiers Media SA

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"Tooth Enamel: Frontiers in Mineral Chemistry and Biochemistry, Integrative Cell Biology and Genetics" incorporates the proceedings of the 9th International Enamel Symposium (Enamel 9) hosted in the UK and chaired by Professor Jennifer Kirkham and Professor Ariane Berdal. The topic covers cellular and molecular aspects of the development, pathology, evolution and repair or regeneration of dental enamel. The original research papers and reviews will be of interest to all enamel and biomineralization researchers. Clinicians will find up-to-date thinking and opinion on the aetiology of enamel pathologies and their potential future treatment via novel strategies for preventing, repairing and regenerating enamel.

Listings of extramural and intramural projects. Information provided is project number, subject, investigator, and laboratory/branch.

In September, 1976, the International Federation for Cell Biology held its first congress in Boston. On this occasion Berlin was chosen as the site for the next congress. This meant an acknowledgement and at the same time a heavy burden for the still young European Cell Biology Organization, which represents a junction of European societies and groups for cell biology. In practical terms, this meant that the members of the young and, compared to the American Society for Cell Biology, small German Society for Cell Biology had to do a good deal of the organizing of the Cell Biology Congress. This is an opportunity for me, as Chairman of the Organizing Committee, and also on behalf of the German Society for Cell Biology, to express my gratitude to all those who have actively participated in the preparations for this Cell Biology Congress. The success of the Congress in Berlin was to a significant extent due to their work. In particular, I would like to especially thank the Secretary General of ECBO Werner Franke, Heidelberg, as well as the Chairman of the Local Organizing Committee, Peter Giesbrecht, Berlin, for the excellent job they did. The Congress in Berlin proved to be significantly larger than that in Boston in 1976. The number of abstracts increased from 1200 to more than 1800. They have been published in the European Journal of Cell Biology. In a similar way the number of symposia and workshops expanded.

This outstanding book covers all areas of oral histology and embryology pertinent to clinical dental practice. Introductory material includes a complete discussion of the structure and function of the body's cells, as well as the stages of orofacial development from conception to birth. It also covers developmental problems such as cleft lip and palate, specific phases of tooth development, and biofilm substances that form on the surface of teeth. New Clinical Comments boxes and Consider the Patient scenarios help readers apply key concepts to actual practice. Provides a timeline of head and neck structural development from conception to birth and describes possible abnormalities in development, including cleft lip and palate. Describes the definitive stages and normal/abnormal paths of tooth development and maturation. Discusses specific hard and soft oral tissues including periodontal tissues, oral mucosa, TMJ, and parts of teeth (enamel, dentin, dental pulp, cementum) to illustrate how these structures develop and are related. Each chapter begins with a helpful chapter outline and a brief overview of chapter content. Consider the Patient boxes present a short case scenario and then discuss possible solutions at the end of the chapter to demonstrate practical applications of key concepts. Self-evaluation questions at the end of every chapter help readers assess their understanding of the material. Tables and boxes throughout the text make it easy to quickly summarize important information. Clinical Comments boxes throughout the chapters present tips that help readers apply key content to everyday clinical practice. Learning Objectives at the beginning of every chapter list important topics readers should know after completing the chapter. An alphabetical list of Key Terms at the beginning of each chapter helps readers learn to use these words in the correct context within clinical practice. Features a wealth of new full-color illustrations and photographs. Evolve website includes a test bank, image collection, weblinks, and interactive student exercises.

The search for mesenchymal stem cells (MSCs) in adult tissues had led to the discovery of stem cells in many tissues in the body, including teeth. A better understanding of the biology of dental stem cell populations is a pre-requisite to allow their future use for clinical purposes. To understand the biology of stem cell niches in the dental pulp, new genes expressed in dental tissues that could serve as markers of dental stem cells were investigated. The mouse incisor differs from mouse molars as well as human teeth in that it erupts continuously throughout the life of the animal. This continuous growth and eruption is related to the presence of the stem cells at the cervical end of the incisor to replace those lost from the incisor tip producing enamel and dentin of the erupting tooth. From a mouse genome microarray using incisor body and cervical pulp cells, several genes were found to be up-regulated in the cervical area which has a MSC niche that provides a source of cells to replace those lost during continuous growth. Thy-1 (CD90) was selected as a stem cell marker to explore mesenchymal stem cell niches in murine dental pulp tissue. Protein expression was confirmed by flow cytometry and Thy-1 expression in cell culture was investigated. Its expression declined gradually with increasing cell passages. Whole mount in situ hybridization at different developmental stages showed that Thy-1 was selectively expressed in the cervical area of incisors, where the MSC niche is located. In order to identify the function of this gene, genetic lineage tracing was used. Thy-1Cre expressing transgenic mice were crossed with Rosa26R reporter mice to follow the fates of Thy-1 expressing cells. Thy-1+ cells contributed to odontoblasts and pulp cells during incisor growth. However not all odontoblasts and pulp cells were Thy-1+ suggesting a complex MSC niche.

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