東京医科歯科大学 グローバルCOE

歯と骨の分子疾患科学の国際研究拠点 ーデント・メドミクスのインテリジェンスハブー



【日程】 2011年

2月1日(火)~2日(水)

【場所】

オークラフロンティアホテルつくば

7305-0031

茨城県つくば市吾妻1-1364-1

(TEL:029-852-1112)

Tokyo Medical &Dental University Global Center of Excellence Program

International Research Center for Molecular Science in Tooth and Bone Diseases

Third Retreat Camp

Feb.1-2,2011 Okura Frontier Hotel Tsukuba 1-1364-1 agatsuma Tsukuba Ibaraki Tel: 029-852-1112



日程

2月1日(火曜日)

10:00東京医科歯科大学集合10:30大学出発 (バス)11:30ホテル到着11:30-12:30昼食

12:50- 開会の挨拶 野田教授

13:00-14:00 特別講演1 Dr.Irma Thesleff

(University of Helsinki)

14:00-15:00 特別講演2 Dr. Adam Engler

(University of California)

15:00-15:15 休憩

15:15-15:45 特別講演3 山下 晃弘先生

(University of Calgary)

15:45-17:45 シャペロンによる講演 一人25分 4名

17:45-18:00 チェックイン

18:00-18:15 ポスター準備

18:15-19:00 夕食

19:00-20:00 セッション2 (ポスター)

20:00-22:00 Dr. Thesleff, Dr. Engler, 山下先生、

シャペロンとのラウンドディスカッション

22:00- ポスター片付け 就寝

2月2日(水曜日)

7:00-8:00 朝食

8:00-8:30 荷造り チェックアウト

8:30-11:30 シャペロンによる講演 6名

11:30-12:30 昼食

13:00-16:00 産業技術総合研究所つくばセンター

講演、見学

糖鎖医工学研究センター 成松 久 センター長

17:30ごろ 大学到着 解散

Schedule

Tuesday Feb 1st, 2011

10:00 am Gather at Main gate, Hongo street, TMDU

10:30am Departure from TMDU by bus

11:30 am Arrive at the Okura Frontier Hotel

11:30-12:30 pm Lunch

12:50am Opening speech by Prof. Noda 13:00-14:00 pm Presentation by Dr. Irma Thesleff

(University of Helsinki)

14:00-15:00 pm Presentation2 by Dr. Adam J Engler

(University of California)

15:00-15:15 pm Break

15:15-15:45 pm Presentation by Dr. Yamashita Akihiro

(University of Calgary)

15:45-17:45 pm Presentation by Chaperones

17:45-18:00 Check-in for the hotel

18:00-18:15 Start Poster Presentation Session

18:15-19:00 pm Dinner

19:00-20:00 pm Poster Presentation Session2

20:00-22:00 pm Round Discussion with Dr.Thesleff,

Dr. Engler, Dr. Yamashita and Chaperones

22:00 pm End of the Poster Session

(Remove your own Poster)

Wednesday Feb 2nd, 2011

7:00-8:00 am Breakfast 8:00-8:30 am Check out

8:30-11:30 am Presentation by Chaperones

11:30-12:30 pm Lunch

13:00-16:00 pm Visiting The National Institute of Advanced

Industrial Science and Technology (AIST)

17:30 pm Arrive TMDU

事業推進担当者



Masaki Noda, M.D., Ph.D. (野田政樹) GCOE Program Leader, Professor Department of Molecular Pharmacology http://www.tmd.ac.jp/mri/mph/index.html



Junji Tagami D.D.S., Ph.D. (田上順次) Professor Department of Cariology and Operative Dentistry http://www.tmd.ac.jp/grad/ope/ope-J.htm



Hiroshi Takayanagi, M.D., Ph.D. (高柳広)

Department of Cell Signaling http://www.tmd.ac.jp/grad/csi/csi-J.htm



Ikuo Morita, Ph.D. (森田育男) Professor Department of Cellular Physiological Chemistry http://www.tmd.ac.jp/dent/cell/cell-J.htm



Ken Omura, D.D.S., Ph.D. (小村健) Professor Department of Oral and Maxillofacial Surgery http://www.tmd.ac.jp/dent/os2/os2-J.htm



Shohei Kasugai, D.D.S., Ph.D. (春日井昇平) Professor Department of Oral Impltantology & Regenerative Dental Medicine http://www.tmd.ac.jp/grad/mfc/mfc-J.htm



Hideaki Suda, D.D.S., Ph.D. (須田英明) Professor Department of Pulp Biology and Endodontics http://www.tmd.ac.jp/dent/endo/endo-J.htm



Yuichi Izumi, D.D.S., Ph.D. (和泉雄一) Professor Department of Periodontology http://www.tmd.ac.jp/dent/peri/peri-J.htm



Masaki Yanagishita, M.D. (柳下正樹) Professor Department of Hard Tissue Engineering Biochemistry http://www.tmd.ac.jp/grad/bch/bch-J.htm



Akira Yamaguchi, D.D.S., Ph.D. (山口朗) Professor Department of Oral Pathology http://www.tmd.ac.jp/dent/opat/opat-J.htm



Keiji Moriyama, D.D.S., Ph.D. (森山啓司) Professor Department of Maxillofacial Orthognathics http://www.tmd.ac.jp/grad/mort/mort-J.htm

Kenichi Shinomiya, M.D., Ph.D.



(四宮謙一) Professor Department of Orthopaedic and Spinal Surgery http://www.tmd.ac.jp/med/orth/orth-J.html



Nobuyuki Miyasaka, M.D., Ph.D. (宮坂信之) Professor Department of Medicine & Rheumatology http://www.tmd.ac.jp/grad/rheu/rheu-J.htm



Takeshi Muneta, M.D., Ph.D. (宗田大) Professor Department of Orthopedic Surgery http://www.tmd.ac.jp/med/orth/orth-J.html



Kazunari Akiyoshi, Ph.D. (秋吉一成) Professor Department of Organic Materials

http://www.tmd.ac.jp/i-mde/www/org/jpn/index.html



Johji Inazawa, M.D., Ph.D. (稲澤譲治) Professor Department of Moleclurar Cytogenetics http://www.tmd.ac.jp/mri/cgen/framepage.htm



Yoshio Miki, M.D., Ph.D. (三木義男) Professor Department of Molecular Genetics http://www.tmd.ac.jp/mri/mgen/index_j.html



Fumitoshi Ishino, Ph.D. (石野史敏) Professor Department of Epigenetics http://www.tmd.ac.jp/mri/epgn/index.html



Hiroshi Shibuya, Ph.D.

(澁谷浩司)

Professor

Department of Molecular Cell Biology http://www.tmd.ac.jp/mri/mri-mcb/index_j.html



Yoshihiro Ogawa, M.D., Ph.D.

(小川佳宏)

Professor

Department of Molecular Medicine and Metabolism http://www.tmd.ac.jp/mri/prm/index.html



Masatoshi Hagiwara, M.D., Ph.D.

(萩原正敏)

Professor

Department of Molecular Medicine and Metabolism http://www.tmd.ac.jp/mri/mri-end/index.html

Nobuhiro Hanada,

(花田信弘)

Professor

International PI Chaperon、AISS · QAISS

Takuya Notomi, Ph.D.

(納富拓也)

Research Assistant Professor

Department of Molecular Pharmacology



Alireza Sadr, D.D.S., Ph.D.

Research Assistant Professor

Department of Cariology and Operative Dentistry



Masatsugu Oh-hora, M.D., Ph.D.

(大洞将嗣)

Research Associate Professor

Department of Cell Signaling



Hiroyuki Nakamura, D.D.S., Ph.D.

(中村博幸)

Research Assistant Professor

Department of Hard Tissue Engineering Biochemistry



limura Tadahiro, D.D.S., Ph.D.

(飯村忠浩)

Research Associate Professor

Department of Oral Pathology



Naoto Haruyama, D.D.S., Ph.D.

(春山 直人)

Research Associate Professor

Department of Maxillofacial Orthognathics



Hideyuki Iwai, M.D., Ph.D.

(岩井秀之)

Research Assistant Professor

Department of Medicine & Rheumatology



Kunikazu Tsuji, M.D., Ph.D.

(辻邦和)

Research Assistant Professor

Department of Orthopedic Surgery



Lee Jiyoung, Ph.D.

(李知英)

Research Assistant Professor

Department of Epigenetics



(澤田直樹)

Research Assistant Professor

Department of Molecular Medicine and Metabolism



Patricia Makishi

Dept. of Cariology and Operative Dentistry 「レジンセメントと象牙質界面における

ナノリーケージについて」



許 ジン

(Xu Jing)

歯髄生物学

視床下部性神経ペプチドによる

中枢性骨代謝制御機構の解明

Uncovering the molecular mechanism of central control of bone remodeling by hypothalamic neuropeptides



Reena Rodriguez

Dept. of Oral Impltantology & Regenerative Dental

「Epigallocatechin-3-gallate 含有 Gelatin Hydrogelを 用いた骨再生に関する研究」



則武 加奈子

Kanako Noritake

Dept. of Oral Impltantology & Regenerative Dental

「スーパーGBR膜「ハイドロゲルシート」の開発」



ハオ 佳

(Hao Jia)

インプラント・口腔再生医学 hydeoxyapatite コーティ ングインプラント埋入時にZoledronic Acidを局所投与し た際の骨形成に与える影響と細菌接着について

Bacterial adhesion and bone formation effect of Zoledronic Acid immobilized hydroxyaptite implants

Paksinee Kamolratanakul

Dept. of Molecular Pharmacology 「ナノゲル scaffold を用いた EP4 アゴニストと BMP の 骨再生能に関する研究」



中川 朋美

Tomomi Nakagawa

Dept. of Molecular Pharmacology 「悪性黒色腫の骨の転移における転写因子 Cizの 役割の解明」



鈴木 尋之

Hiroyuki suzuki

Dept. of Maxillofacial Orthognathics 「可溶型 fibroblast growth factor receptor2 (FGFR2) の 頭蓋冠縫合部早期癒合症に対する治療効果」



Erik Idrus

Dept. of Cell Signaling 「RANKL刺激によるNFATc1制御遺伝子と microRNAの同定



Gamaralalage Amodini Rajakaruna

Dept. of Periodontology 「歯周病とバージャー病の関連の解明」



藤田 浩二

Koji Fujita

Dept. of Orthopaedic and Spinal Surgery 「Vitamin Eの骨代謝に対する影響について」



木原 翼

Tasuku Kihara

Oral pathology

骨芽細胞分化と骨再生におけるCCN3の役割 The role of CCN3 in osteoblast differentiation and bone regeneration



古田 繭子

Mayuko Furuta

分子細胞遺伝学 (Molecular Cytogenetics) 新たなRNA創薬に寄与する癌制御性microRNAの機 能的スクリーニング



Exploration of novel tumor-suppresive microRNAs using functional genomics-assisted approach

安藤 彰子

Akiko Ando

バイオイメージングを用いた歯周組織幹細胞の同定 Identification of periodontal stem cells by bioimaging approaches



Bharti Pariksha

歯周病学

歯周治療が全身の炎症に与える影響 Effect of Periodontal Treatment on systemic inflammation.

辻 香織

Kaori Tsuji

顎顔面矯正学

Zinc finger 型転写因子POKEMONの破骨細胞におけ る役割の解明

Investigation of the role of zinc finger transcription factor, POKEMON in osteoclasts



許 レン

XU Ren

整形外科 (Orthopaedic and Spinal Surgery) 視床下部性神経ペプチドによる中枢性骨代謝制御機構の解明 Uncovering the molecular mechanism of central control of bone remodeling by hypothalamic neuropeptides



周 夢宇

Zhou Mengyu

歯髄生物学 (Pulp Biology and Endodontics) 歯根形成のメカニズム-SCAP (根尖部幹細胞) からの象牙芽 細胞およびセメント芽細胞分化に関与する因子の解明 The mechanisms of root formation- Elucidation of the signaling molecules on odontoblast and cementoblast



Smriti Aryal A. C

differentiation from SCAP

分子薬理学 (Molecular Pharmacology) 細胞骨格による骨代謝制御の分子機構 -Nckの骨の細 胞機能調節に於ける役割の解明-



Molecular Mechanisms Underlying Cytoskeletal Regulation of Bone Metabolim-Role of Nck Proteins in Bone Cell Function-

Chokechanachaisakul Uraiwan

歯髄生物学 (Pulp Biology and Endodontics) ラットを用いた歯髄生物学 Rat's pulp biology



Kunawarote Sitthikorn

う蝕制御学

う蝕象牙質に対する接着性能の改良 Improve Bond strength to Caries-affected dentin



Ilnaz Hariri

う蝕制御学

高度に石灰化した接着界面構造の作成と機械的性質の評価 Generation of hyper mineralized adhesive Interface and study on its mechanical properties



AL-BARI MD. ABDUL ALIM

分子情報伝達学 (Cell Signaling)

破骨細胞分化を制御する phosphatidylinositol-3,4,5trisphosphate 結合タンパク質の同定と機能解析 Identification and analysis of phosphatidylinositol-3,4,5-trisphosphatebinding proteins (PIP₃BPs) that regulate osteoclast differentiation



古市 祥子

Akiko Furuichi

インプラント・口腔再生医学

酸素ナノバブル水の骨組織における生体活性評価 Evaluation for the biologically activity of oxygen nano bubbles solution (OXNB)



Hamid Nurrohman

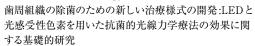
う蝕制御学 (Cariology and Operative Dentistry) 人口口腔装置を用いたバイオフィルムによるう蝕形成後の Super Dentin"のナノ構造解析



The effect of collagenolytic inhibitors on the quality of acid-base resistant zone in dentin

Chui Chanthoeun

歯周病学 (Periodontology)



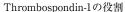


Development of a New Treatment Modality for Periodontal Disinfection: Basic Study on the Effect of Antimicrobial Photodynamic Therapy using the Combination of an LED

light Source and a Photosensitizing Dye

Samir Kumar Pal

口腔病理学 (Oral Pathology) 口腔扁平上皮癌による骨破壊における

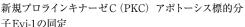




The Role of Thrombospondin-1 (TSP-1) in Bone Destruction by Oral Squamous Cell Carcinoma

Hoi Chin Hew

遺伝子応用医学

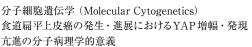




Identification of Evi-1 as a novel PKC Apoptosis Regulatory Target

村松 智輝

Tomoki Muramatsu





Significance of YAP amplification/overexpression in the pathogenesis of esophageal squamous cell carcinoma

鈴木 允文

Suzuki Takafumi

歯周病学



骨吸収を引き起こす咬合性外傷の分子機構について解 析する-TRPV4の役割-

Molecular mechanism underlying occlusal trauma, induced-bone loss Role of TRPV4

宮嶋 大輔

Daisuke Miyajima

顎顔面外科 (分子薬理)



骨代謝における負のMCSFシグナルによる新制御機構の解析 -Dok アダプター分子による破骨細胞制御と骨粗鬆症-

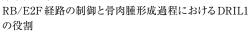
Novel Insights into Negative Molecular Regulation of MCSF Signaling in Bone Metabolism -Function of Dok Adaptor Molecules in Osteoclasts and Osteoporois -





咽頭鰓弓および咽頭鰓発生への外胚葉上皮の関わり Tracing the fate of ectoderm during the pharyngeal arch development

Kandakar Abu Shameem Md. Saadat 分子発生学



The Role of DRIL1in the Regulation of RB/E2F Pathway and Tumorigesis of Osteosarcoma

関根 由莉奈

高次生命科学

ナノゲル リポソーム複合体ハイブリッドゲルの設計と 医療応用

Design and Application of Hydrid Hydrogels with Nanogel-coated Liposomes complex

馬成山

(Ma Chengshan)

整形外科学

骨リモデリングにおける中枢神経制御の経路 A Novel Central-Control Pathway of Bone Remodeling

妻沼 有香

歯周病学

歯根膜細胞シートのインプラント両方への応用 Application of periodontal ligament cell sheet for implant therapy.

Bhargava Suhas Srilatha

インプラント・口腔再生医学

Y-TZP ジルコニアの表面処理が骨芽細胞と線維芽細胞 に及ぼす影響

Surface modified Y-TZP Zirconia: its effect on osteoblasts and fibroblasts in vitro



硬組織薬理学

TNF aと RANKLアンタゴニストである W9 ペプチドの 骨形成における役割

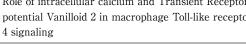
A Role of TNF- α and RANKL antagonist peptide W9 on osteogenesis

滝沢 文彦

発生発達病態学

マクロファージ Toll-like receptor 4 シグナルにおける 細胞内カルシウムおよび Transient Receptor potential Vanilloid 2の役割の解析

Role of intracellular calcium and Transient Receptor potential Vanilloid 2 in macrophage Toll-like receptor 4 signaling



白 樺

Bai Hua

Dept. of Moleclurar Cytogenetics 「ヒト癌におけるオートファジー関連遺伝子 LC3Avl 遺伝子の機能解析」

Bakhsh, Turki Abdulsalam A.

う触制御学

コンポジットレジン接着界面の長期的な挙動について、 SS-OCTを用いた定量的評価

SS-OCT as a new tool for long term quantitative evaluation on the resin-dentin interface in a bonded restoration





Warunee Pluemsakunthai

インプラント・口腔再生医学

ウサギ頭蓋骨欠損モデルにおける改良 PRF 含有α TCP の骨再生における有用性の検討

The effect of platelet rich fibrin (PRF) preparation with Alpha-tricalcium phosphate (a-TCP) enhance bone regeneration in rabbit calvarium

森田 淳平

顎顔面矯正学

可浴型線維芽細胞成長因子受容体2を用いたアペール 症候群の新規治療方法の開発 - アペール症候群表現型 の救済 -

The development of novel treatment for Apert syndrome by a soluble form of FGFR2-Rescue of Apert phenotypes

Bijaya Baobam

細菌感染制御学

オートファジーおよび免疫応答におけるA群レンサ球菌 認識機構の解析

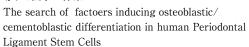


Molecular analysis of recognition mechanisms of Group A Streptococcus in autophagic degradation system and immune responses

山田 梓

歯周病学

ヒト歯根膜幹細胞の骨芽細胞/セメント芽細胞分化を誘 導する因子の探索





歯周病学

歯周病原細菌によるWnt5a 遺伝子発現機構の解析 The modulation of Wnt5a expression by periodontopathic bacteria



中根 綾子

小児歯科学

慨定量的in situ 蛍光イメージングによる骨細胞の慨日リズムの可視化と、成長発達過程におけるその機能解析



Quantitative in situ fluorescent imaging approach for functional dynamics of osteocytes through circadian oscillation during growth and development

Nurmaa Dashzeveg

バイオ情報学

骨肉腫におけるP53によって誘導されるアポトーシス関連遺伝子の解析

Discovery of pro-apoptotic genes induced by p53 in osteosarcoma

ヒト歯根膜細胞におけるレーザー照射およびサイトカイン

荻田 真弓

歯周病学

刺激による human-beta-defensin(HBDs)発現の探査 The expression of HBDs by laser irradiation, various cytokines and bacterial components in human PDL cells

山口 佑季

バイオ情報学

哺乳類の特徴的形質における哺乳類特異的遺伝子群の役割 The role of mammalian specific genes in mammalian characteristics



大上 えりか

顎顔面外科学

口腔扁平上皮癌が生産する破骨細胞性骨吸収制御因子 の同霊

Identification of osteoclastic bone resorption regulatory factors produced by oral squamous cell carcinoma



湯浅 将人

整形外科学

デキサメタゾン併用によるBone morphogenetic protein による骨形成に対する有効性の検討

The efficiency of bone formation by BMP with dexamethasone

宮部 斉重

膠原病・リウマチ内科学

関節リウマチ病態形成におけるLPA/LPA受容体、

ATXの関与

Pathogenic roles of LPA/LPA receptors and ATX on the rheumatoid arthritis

山田 剛史

整形外科学

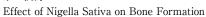
骨髄由来間葉系細胞 (MSC) の質 - 骨形成抑制因子の同定 -

The significance of the quality of the human bone marrow mesenchymal cells (hBMMCs) in the bone formation

Rojbani Hisham Khalifa

インプラント・口腔再生医学

ブラッククミン (Nigella Sativa) の骨再生における効果の検討



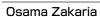


チェン康

(Chang Kang)

インプラント・口腔再生医学 歯科用インプラント周囲 骨における直流電流装置を用いた骨形成促進作用に関す

A direct current device for accelerating bone formation in tissues surrounding a dental implant.



インプラント・口腔再生医学

異なる表面性状を有する歯科用インプラント周囲骨における電気的刺激を用いた骨形成促進作用に関する研究 Electrical stimulation for accelerationg Peri-implant bone formation of different implant surfaces



岩崎 陽平

分子薬理学

骨に対するPTH作用におけるCB2の調節作用の解析

- 骨細胞集団および中枢神経系の骨量調節における連 関の解明 -

Analysis of regulatory effect of CB2 to the PTH effect to Bone. Relevance of Bone Cell Assembly (BCA) and Central Nervous System (CNS) in the maintenance of bone-

長谷川 久紀

膠原病・リウマチ内科学

関節リウマチ (RA) の新規治療標的となるmicroRNAの探究 Identification of microRNA as a new therapeutic target for rheumatoid arthritis.



福田真

膠原病・リウマチ内科学

関節リウマチ病態形成におけるFROUNTの関与 Pathogenic roles of FROUNT on Rheumatoid Arthritis



佐藤 潔

顎口腔外科学

口腔扁平上皮癌の顎骨浸潤における癌関連線維芽細胞

Roles of carcinoma-associated fibroblasts in bone invasion by oral squamous cell carcinoma

Marwa Madi

インプラント・口腔再生医学

インプラント周囲炎を誘発させた状態における、HA薄 膜スパッタリングインプラントと、他の表面性状インプラ ントの比較

Experimental periimplantitis at HA sputtered coated implants in comparison to other surface treatments

渡辺 千穂

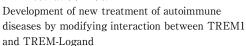
顆額面矯正学

骨代謝におけるRNA stabitlityの機能解析 Functional analysis of RNA stability in bone metabolism

細矢 匡

膠原病・リウマチ内科学

TEAM1-TREM1-Ligand 相互作用修飾による自己免疫 疾患の新規治療法の開発





(Cheng Xu)

整形外科学

骨形成におけるmicroRNAの役割

Role of microRNA in bone formation

木村 直樹

膠原病・リウマチ内科学

腫瘍による筋炎発症のメカニズムの解析

Analysis of cancer-associated autoimmune myosis

Prasansuttiporn Taweesak

う蝕制御学

次亜塩素酸ナトリウム処置後象牙質に対するrosmarinic acidの接着強さ及び耐久性への影響

Effect of rosmarinic acid on bond strength and bond longevity to NaOCL-treated dentin.

Adorno Quevedo Carlos Gabriel

歯髄生物学

ラット歯髄の慢性炎症後にみられるリンパ管新生

Lymphangiogenesis in the rat dental pulp following induced chronic inflammation



安岡

潤-高次生命科学

カチオン性ナノゲルによる新規核酸デリバリーシステム Novel nucleic acid Delivery Systems by Cationic Nanogel

鈴木 晶子

膠原病・リウマチ内科学

マウス膠原病モデルの病態における体液調整因子の働 きを明らかにする。

The role of circulating plasma volume regulation factors in murine arthritis and myositis model

高次生命科学

新規ナノゲルによるタンパク質デリバリー

Protein Delivery by Novel Nanogel

宮原 宇将

インプラント・口腔再生医学

ナノゲルを用いた骨再生に関する研究

A research on bone regeneration by using Nanogel

Thitthaweerat Suppason

う蝕制御学

次亜塩素酸ナトリウムとロスマリン酸の失活歯への接着 強さと長期接着耐久性に及ぼす影響

Influence of NaOCIand rosmarinic acid on bond strength and long-term bond durability in endodontically treated tooth

Md.Sofigul Islam

フラボノイドによる、象牙質コラーゲン保護と脱灰象と 質の再石灰効果 - 新しい根面蝕歯 -

治療アプローチ

Flavonoid Reserves Dentin Collagen and Promotes human Root Dentin Lesion Re-mineralization in vitro

Gerardo Jose Joves Mendez

う蝕制御学

塩化カルシウム・フッ素含有ボンディングシステムを用い た歯質接着界面の強化

Reinforcement of adhesive interface using a CaCl2/ fluoride-incorporated bonding system

芦垣 紀彦

歯周病学

歯周病原細菌が慢性腎不全を悪化させる病因の解析 Periodontal bacteria aggravate chronic renal failure by subtotal nephrectomy in mice

Paveenarat Aukkarasongsup

顎顔面矯正学

低酸素状態下のマウス歯根幕細胞におけるペリオスチン 遺伝子発現制御メカニズムの解析:低酸素応答領域の同 定とHIF-1経路関わり

Analysis of periostion gene expression in mouse periodontal ligament cells under hypoxia: identification of HRE and HIF-1 pathway

渡辺 高

顎顔面外科学

in situ 蛍光イメージング解析による、骨の分化・再生にお ける Runk2 タンパク細胞内動態の新規調節機構の解析

Investigation of novel subcelular bynamics of Runx2 during bone differentiation and regeneration by in situ fluorescent imaging analysis





坂野 若詠

う蝕制御学

新規象牙質接着システムの開発及び評価について Developing resin composite restoration with adhesive system

Rumana Khanom

口腔病理学

シグナル分子としてのケラチン17が癌の骨浸潤に果たす 役割の解析

The functional role of leratin 17 as a signaling molecule in bone invasion of oral cancer

Duarte Puerto Carolina Lizeth

顎顔面矯正学

磁気制御されたRelaxin と BMP-2ナノ粒子を用いた 骨縫合の拡大

Sutural Expansion Assisted With Magnetically Controlled Site Specific Relaxin and BMP-2 Nanoparticles

于 淼

(Yu Miao)

インプラント・口腔再生医学

尾部懸垂マウスを用いた、骨再生におけるメカニカルスト レスの関与に関する研究

The role of mechanical stress in bone regeneration using tail suspension mice

上園 将慶

顎顔面矯正学 低浸襲かつ早期に骨接合する新規矯正用 デバイスの開発

Development of minimally invasive and rapidly osseointegratable orthodontic devices

Amir Nazari

う蝕制御学

う触脱灰象牙質を高度石灰化組織へと変化させるため の再石灰化技術の創造

Developing a Dentin Remineralising Method (DRM) to Transform Carious Demineralised Dentin into Hypermineralised Substrate

Gombo Bolortuya

Dept. of Pulp Biology and Endodontics 「インテグリン発現を評価することによる象牙芽細胞の 成熟とシグナル伝達に対する低出力レーザー療法の効果」



伊達 佑生

Yuki Date

Dept. of Oral Impliantology & Regenerative Dental Medicine

「歯根発生に関する因子の同定」

大城 暁子

健康推進歯学

FDC-SPの口腔内組織での機能

The roles of FDC-SP in oral tissues

Aslam Al Mehdi

Dept. of Periodontology 「歯周疾患は動脈疾患の進行に重要な リスクファクターとなる」



松本 力

Tsutomu Matsumoto

口腔病理学

矯正的歯の移動における骨細胞の役割

The role of osteocyte in orthodontic tooth movement

Wayakanon Praween

分子細胞機能学(Cellular Physiological Chemistry) アニュラーギャップジャンクションの形成機構

The Mechanisms of Annular Gap Junction Formation



青井 陽子

Yoko Aoi

Dept. of Cellular Physiological Chemistry 「低酸素下におけるサイトカイン産生変動機序~ メチル化の関与」



下田 麻子

Asako Shimoda

有機材料 (Organic materials) ナノゲル架橋ハイドロゲルによるタンパク質デリバリー

Design of Nanogel-assembled hydrogel for protein delivery

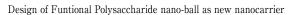


高橋 治子

Haruko Takahashi

有機材料 (Organic materials)

Polysaccharide nano-ball を用いた新規ナノキャリアの開発





Tooth organogenesis and regeneration

Irma Thesleff

Institute of Biotechnology, University of Helsinki, Finland



The process of tooth development is understood in great detail at the level of cells and genes. Dozens of important genes and molecules are known which regulate the initiation and morphogenesis of teeth as well as the formation of the dental hard tissues. Of special significance for organogenesis are interactions between the two key tissues forming the teeth, the epithelium and mesenchyme, and the molecules associated with the signal pathways regulating communication between the epithelial and mesenchymal tissues. The signal molecules of the conserved families, TGFbeta, FGF, Wnt, Hedgehog and TNF (in particular Ectodysplasin, Eda) regulate the numbers, shapes and sizes of teeth. Recent work has indicated that inhibitors with regulate signalling activity, and it is thought that subtle variations in signaling networks have contributed to the differences in the dentitions and tooth morphologies between vertebrate species.

The capacity to regenerate teeth has been largely lost during evolution, and it has been suggested that this is also associated with variation in signal activities, in particular in the Wnt signal pathway. Stem cells have been discovered in teeth, and in the mouse dentition they have been located in a niche in the continuous growing incisors. This bears anatomical similarities to the stem cell niches in other epithelial organs, in particular in hairs and intestine. The maintenance and differentiation of these stem cells is regulated by epithelial-mesenchymal interactions and the same conserved signal molecules as tooth morphogenesis. More thorough understanding of the molecular signatures of the stem cells and the epithelial and mesenchymal tissues and their interactions will be crucial for successful bioengineering of teeth in the future.

For more information: Thesleff, I, Tummers, M.: Tooth organogenesis and regeneration. In: StemBook, 2009, http://www.stembook.org

CURRICULUM VITAE

Education and Training

Graduation from Dental School (DDS)

University of Helsinki 1972

Doctor of Odontology (Dr.Odont)

University of Helsinki 1975

Docent (Lecturer) in Developmental Biology

University of Helsinki 1980

Specialist's rights in orthodontics 1983

Previous professional appointments

Research Associate, the Academy of Finland 1973-1976 Instructor, Dept. of Pedodontics and Orthodontics, University of Helsinki 1976-1978 Visiting Associate, Laboratory of Developmental Biology and Anomalies, NIDR, Bethesda, MD, USA 1978-1979 Instructor, Dept. Pedodontics and Orthodontics, Univ. Helsinki 1979-1983 1983-1990 Scientist, Academy of Finland Professor and Chairman, Department of Pedodontics and Orthodontics, University of Helsinki 1990-2004

Research awards and honors

Pohjola Prize, Finnish Dental Society and Finnish Dental Association 1987 Distinguished Scientist Award in Craniofacial Biology, 1993 Int.Assoc.Dent.Res.(IADR) Finnish Academy of Science and Letters (Suom. Tiedeakat.), invited member 1994 1995 Thuréusprize, Umeå university City of Helsinki Science Award 1997 Honorary Doctor in Odontology, University of Göteborg 1997 International Prize, Swedish Dental Society 1997 1998-2003 Academy Professor, Academy of Finland Anders Jahre Prize in Medicine, Oslo University 1999 Acta Odontologica Scandinavica Prize for "Excellent 2000 contribution to dental research" EMBO, invited member 2000 Honorary Doctor in Odontology, University of Copenhagen 2002 Honorary Doctor in Science, McGill University, Montreal 2004 Professor of the Year, Finnish Association of 2005 University Professors Sheldon Friel Memorial Lecturer, European Orthodontic 2005 Society Finnish Society of Sciences and Letters (Suom. Tiedeseura). invited member Honorary Doctor, Katholieke Universiteit Leuven, Belgium

Honorary Professor in Craniofacial and Dental Genetics, University of Copenhagen 2005-2010 William J. Gies Award for best paper in J.Dent.Res., IADR/AADR 2006 Chair, Gordon Conference on "Craniofacial Morphogenesis & Tissue Regeneration 2008 President, European Orthodontic Society 2008-2009 Honorary Doctor, University of Debrecen, Hungary 2008 Isaac Schour Memorial Award, IADR 2008 Honorary Doctor, University of Oslo 2008 2009 AAAS Fellow Valkhof Chair (Visiting Professor), Radboud University 2009 Nijmegen, The Netherlands Apollonia Prize, Finnish Dental Society 2009 Paul Goldhaber Award, Harvard School of Dental Medicine 2010 2010 Honorary Doctor, Karolinska Institutet, Stockholm

Major research grants

The Academy of Finland, yearly project and program grants 1982-2001 2008-2011 National Institutes of Health, Dental Research grant 1 ROI DE09399 1990-1993 University of Helsinki, Biocentrum Helsinki grant 1994-2009 Sigrid Jusélius Foundation 1989-1992 1996-2008 Human Frontiers Science Program (with Paul Sharpe & J.V. Ruch) 1995-1998 Center of Excellence grant (Dev.Biol.Program), University of Helsinki 1997-2001 National Institutes of Health, NIDCR (with R.D ´ Souza) 1999-2003 Center of Excellence funding, Academy of Finland 2002-2007 Sigrid Juselius Foundation, major 5-year grant 2008-2013

Scientific expert functions

Supervisor of doctoral thesis works: 20 times Opponent of doctoral thesis works: 13 times External reviewer for: professor: 9 times promotion to professorship: 25 times

doctoral thesis: 23 times

Member of International Scientific Advisory R

Member of International Scientific Advisory Board: 6 Member of International Scientific Evaluation Committees: 12

Reviewer of grant applications: 22 international organizations

Member of the Editorial Board: 12 international scientific journals

Referee: for over 30 international scientific journals

2005

Participation in Scientific Meetings

Invited lectures in 125 international conferences 61 seminars in foreign universities/research institutions

Selected publications 1990-2008 (out of a list of over 270)

Vainio, S., Karavanova, I., Jowett, A., Thesleff, I. Identification of BMP-4 as a signal mediating secondary induction between epithelial and mesenchymal tissues during early tooth development. Cell 75: 45-58, 1993.

Jowett, A.K., Vainio, S., Ferguson, M.W.J., Sharpe, P.T., Thesleff,I. Epithelial-mesenchymal interactions are required for msx 1 and msx 2 gene expression in the developing murine molar tooth. Development 117: 461-470, 1993.

Mitsiadis, T., Muramatsu, T., Muramatsu, H., Thesleff, I. Midkine (MK), a heparing-binding growth/differentiation factor, is regulated by retinoic acid and epithelialmesenchymal interactions in the developing mouse tooth, and affects cell proliferation and morphogenesis. J Cell Biol. 129: 267-281, 1995

Mitsiadis, T.A., Lardelli, M., Lendahl, U., Thesleff, I. Expression of Notch 1, 2 and 3 is regulated by epithelialmesenchymal interactions and retinoic acid in the developing mouse tooth and associated with determination of ameloblast cell fate. J. Cell Biol. 130: 407-418, 1995.

Jernvall, J., Åberg, T., Kettunen, P., Keränen, S., Thesleff, I. The life history of an embryonic signaling center: BMP-4 induces p21 and is associated with apoptosis in the mouse tooth enamel knot. Development 125:161-169, 1998

Kim, H-J., Rice, D.P.C., Kettunen, P.J., Thesleff, I. FGF-, BMP- and Shh-mediated signalling pathways in the regulation of cranial suture morphogenesis and calvarial bone development. Development 125:1241-1251, 1998

D´Souza, R.N., Åberg, T., Gaikwad, J., Cavender, A., Owen , M., Karsenty, G., Thesleff, I.

Cbfa 1 is required for epithelial-mesenchymal interactions regulating tooth development in mice. Development 126:2911-2920, 1999

Mikkola, M., Pispa, J., Pekkanen, M., Paulin, L., Nieminen, P., Kere, J., Thesleff, I.

Ectodysplasin, a protein required for epithelial morphogenesis, is a novel TNF homologue and promotes cell-matrix adhesion. Mech. Dev. 88:133-146, 1999

Harada, H., Kettunen, P., Jung, H-S., Mustonen, T., Wang, Y.A., Thesleff, I.

Localization of putative stem cells in dental epithelium and their association Notch and FGF signaling. J. Cell Biol. 147:105-120, 1999

Pispa, J., Jung, H-S., Jernvall, J., Kettunen, P., Mustonen, T., Kere, J., Thesleff, I.

Cusp patterning defect in Tabby mice teeth and its partial rescue by FGF. Dev. Biol. 216:521-534, 1999

Rice, P., Åberg. T., Chan, Y-S., Kettunen, P., Pakarinen, L., Maxson, R.E., Thesleff,I.

Integration of FGF and TWIST in calvarial bone and suture development. Development 127:1845-1855, 2000

Jernvall, J., Keränen, S.V.E., Thesleff, I. Evolutionary modification of development in mammalian teeth: Quantifying gene expression patterns and topography. Proc. Nat. Acad. Sci. USA 97:14444-14448, 2000

Jernvall, J., Thesleff, I. Reiterative signaling and patterning in mammalian tooth morphogenesis. Mech. Dev. 92: 19-29, 2000.

Laurikkala, J., Mikkola, M., Mustonen, T., Åberg, T., Koppinen, P., Pispa, J., Nieminen, P., Galceran, J., Grosshedl, R., Thesleff, I. TNF signaling via the ligand-receptor pair ectodysplasin and edar controls the function of epithelial signaling centers and is regulated by Wnt and activin during organogenesis. Dev.Biol. 229: 443-455,2001

Laurikkala J, Pispa, J., Jung H-S, Nieminen P, Mikkola M, Wang X, Saarialho-Kere U., Galceran, J., Grosschedl, R., Thesleff I. Regulation of hair follicle development by the TNF signal ectodysplasin and its receptor Edar. Development 129:2541-2553, 2002

Mustonen, T., Tummers, M., Mikami, T., Itoh, N., Zhang, N., Gridley, T., Thesleff, I. Lunatic fringe, FGF, and BMP regulate the Notch pathway during epithelial morphogenesis of teeth. Dev. Biol. 248:281-293, 2002

Tummers, M. and Thesleff, I.: Root or crown: a developmental choice orchestrated by the differential regulation of the epithelial stem cell niche in the tooth of two rodent species. Development 130:1049-1057, 2003.

Mustonen, T. Pummila, M., Kangas, A., Mikkola, M. Pakkasjärvi, L., Pispa, J., Jaatinen, R., Thesleff, I.: Ectodysplasin-A1 stimulates the development of ectodermal organs. Dev. Biol. 253: 123-136, 2003

Pispa, J., Thesleff, I.: Mechanisms of ectodermal organogenesis. Dev. Biol. 262: 195-205, 2003

Laurikkala, J., Kassai, Y., Pakkasjärvi, L., Thesleff, I., Itoh, N.: Identification of a secreted BMP antagonist, ectodin, integrating BMP, FGF and SHH signals from the tooth enamel knot. Dev. Biol. 264: 91-105, 2003

Lammi, L., Arte, S., Somer, M., Järvinen, H., Lahermo, P., Thesleff, I., Pirinen, S., Nieminen, P.: Mutations in AXIN2 cause familial tooth agenesis and predispose to colorectal cancer. Am. J. Hum. Genet. 74: 1043-50, 2004

Åberg, T., Wang, X-P., Kim, J-H., Yamashiro, T., Bei, M., Rice, R., Ryoo, H-M., Thesleff, I.: Runx2 mediates FGF signalling from epithelium to mesenchyme during tooth morphogenesis. Dev. Biol. 270: 76-93, 2004

Wang, X-P., Suomalainen, M., Jorgez, C.j., Matzuk, M.M., Werner, S., and Thesleff, I.: Follistatin regulates enamel patterning in mouse incisors by asymmetrically inhibiting BMP signalling and ameloblast differentiation. Dev. Cell 7: 719-730, 2004

Kangas, A.T., Evans, A.R., Thesleff, I., Jernvall, J.: Non-independence of mammalian dental characters. Nature 432: 211-214, 2004

Kassai, Y., Munne, P., Hotta, Y., Penttilä, E., Kavanagh, K., Ohbayashi, N., Takada, S., Thesleff, I., Jernvall, J., Itoh, N.: Regulation of mammalian cusp patterning by ectodin. Science 309: 2067-2070, 2005.

Laurikkala, J., Mikkola, M.L., James, M., Tummers, M., Mills, A., Thesleff, I.: P63 regulates multiple signalling pathways required for ectodermal organogenesis and differentiation Development 133: 1553-1563, 2006.

Järvinen, E., Salazaar-Ciudad, I., Birchmeier, W., Taketo, M.M., Jernvall, J., Thesleff, I. Continuous tooth generation in mouse is induced by activated epithelial Wnt/ Bcatenin signalling. Proc. Natl. Acad. Sci USA 103: 18627-18632, 2006.

Pummila, M., Fliniaux, I., Jaatinen, R., James, M., Laurikkala, J., Schneider, P., Thesleff, I., Mikkola, M.L. Ectodysplasin has a dual role in ectodermal organogenesis: inhibition of BMP activity and induction of Shh expression. Development 134: 117-125, 2007.

Wang, X-P., Suomalainen, M, Felszeghy, S., Zelarayan, L.C., Alonso, M.T., Plikus, M.V., Maas, R., Chuong, C-M., Schimmang, T., Thesleff, I. An integrated gene regulatory

network controls epithelial stem cell proliferation in teeth. PLoS Biology 5: 1324-1333, 2007

Närhi, K., Järvinen, E, Birchmeier, W., Taketo, M., M., Mikkola, M.M., Thesleff,I. Sustained epithelial {beta}-catenin activity induces precocious hair development but disrupts hair follicle down-growth and hair shaft formation. Development 135:1019-1028, 2008

Main Research area:

Molecular regulation of the development of teeth and other ectodermal organs (hair, glands) and craniofacial bones. Use of mouse models, analysis of stem cells and signaling pathways.

"Touchy-Feely" Stem Cells: Lessons for Regenerative Medicine from **Matrix Biology**

Adam J Engler

Dept. of Bioengineering University of California, San Diego; La Jolla, CA USA

Mesenchymal stem cells (MSCs) are responsive to the physical properties of their adjacent extracellular niche, e.g. stiffness, which varies dramatically during development and between tissues and drives stiffness-based differentiation into muscle and bone. MSCs have also recently been used to repair myocardial function post-infarct, but this treatment has had limited success, in part due to MSC calcification within the heart wall from a stiffening 3-fold from the infarct scar. Using biopolymers which mimic developmental changes, e.g. myocardial matrix stiffening between days E2 to E13, we have recently been able to control cell differentiation versus static gels in this environment and this can play a protective role in regenerate myocardial strategies. Infarction can also induce distinct stiffness gradients, $\sim 8.7 \pm 1.5$ kPa/mm, which could drive MSC migration. Surprisingly, MSCs appear to undergo directed migration up stiffness gradients, or "durotaxis," in physiological gradients as shallow as 1.0 ± 0.1 kPa/mm, indicating a 'differentiation hierarchy' since when given the choice MSCs will durotax into the stiffest regions of the niche and then differentiate based on niche elasticity. Developing increasingly biomimetic systems represents a new approach to tissue engineering that may better our understanding of regeneration.

ACADEMIC APPOINTMENTS AND AFFILIATIONS

University of California, San Diego; San Diego, CA 2008 present

Assistant Professor, Department of Bioengineering

Member, UCSD Stem Cell Institute

Member, Material Science Graduate Program

Member, Biomedical Sciences Graduate Program

Research Areas: 1) Extracellular matrix regulation of embryonic and mesenchymal stem celldifferentiation

- 2) Developmental biology and mechanics of myocardium
- 3) Cell adhesion to 3-dimensional fibronectin matrix

EDUCATION AND RESEARCH TRAINING

Postdoctoral Princeton University; Princeton, NJ 2006 -

Fellowship Dept. of Molecular Biology

> Research Area: Fibronectin's influence on embryonic stem cells and cell adhesion Advisor: Jean E. Schwarzbauer, Ph.D.

Ph.D. University of Pennsylvania; Philadelphia, PA

2006

Biophysical Engineering Lab

Dissertation Title: Mechanochemical

Signaling Directs Cell State: A Mechanics of

Materials Foundation for Cell Biology Advisor: Dennis E. Discher. Ph.D.

B.S.E. University of Pennsylvania; Philadelphia, PA

Major: Bioengineering Minor: Mathematics

SELECTED HONORS AND FELLOWSHIPS

- NIH New Innovator Award (2009)
- Rita Schaffer Young Investigator Award, Biomedical Engineering Society (2008)
- Rupert Timpl Award, International Society for Matrix Biology (2008)
- National Research Service Award, National Cancer Institute/Princeton (2006-2008)
- John A. Goff Prize, University of Pennsylvania (2006)
- Graduate Research Symposium Award, University of Pennsylvania (2006)
- Graduate Student Award, International Society of Biorheology (2005)
- Graduate Student Award, Biomedical Engineering Society (2004)
- Ashton Foundation Predoctoral Fellowship (2002-2006)
- National Science Foundation REU Fellowship (2001)

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Society for Cell Biology (2002-present)
- American Society for Matrix Biology (2008-present) Adam J. Engler Page 2 of 7 December 2010
- American Society for Mechanical Engineering (2002-2007, 2010-present)
- Biomedical Engineering Society (2002-present)
- Biophysical Society (2002-present)
- International Society for Stem Cell Research (2008-present)
- Tissue Engineering and Regenerative Medicine International Society (2009-present)

PUBLICATIONS

REFEREED JOURNAL PUBLICATIONS

- 1. LoPresti, C., Forster, S., Massignani, M., Warren, N., Madsen, J., Armes, S., Vasilev, C., Hobbs, J., Chirasatitsin, S., Engler, A.J., Battaglia, G. "Wet nano-scale imaging and testing of polymersomes" (submitted)
- 2. LoPresti, C., Massignani, M., Fernyhough, C., Blanazs, A., Ryan, A., Madsen, J., Warren, N., Armes, S., Chirasatitsin, S., Engler, A.J., and Battaglia, G. "Controlling Polymersomes Surface Topology at the Nanoscale by Membrane Confined Polymer/Polymer Phase Separation" ACS Nano (in press)
- 3. Tse, J.R. and Engler, A.J. "Stiffness Gradients Mimicking In Vivo Tissue Variation Regulate Mesenchymal Stem Cell Fate" PLoS One (in press; DOI: 10.1371/journal.pone.0015978)
- 4. Young, J.L., and Engler, A.J. "Hydrogels with Time-Dependent Mechanical Properties Enhance Cardiomyocyte Differentiation In Vitro" Biomaterials, 2011. 32(4): 1002-1009.
- 5. Flores-Merino, M.V., Chirasatitsin, S., LoPresti, C., Reilly, G.C., Battaglia, G., and Engler, A.J. "Nanoscopic Mechanical Anisotropy in Hydrogel Surfaces" Soft Matter, 2010. 6(18): 4466-4470.
- 6. Tse, J.R. and Engler, A.J. "Preparation of Hydrogel Substrates with Tunable Mechanical Properties" Curr Protoc Cell Biol, 2010. Chapter 10: Unit 10.16: 1-16.
- 7. Chirasatitsin, S. and Engler, A.J. "Detecting Cell-Adhesive Sites in Extracellular Matrix using Force Spectroscopy Mapping" J Phys: Condensed Matter, 2010. 22(19): 194102
- 8. Reilly, G.C. and Engler, A.J. "Intrinsic Extracellular Matrix Properties Regulate Stem Cell Differentiation" J Biomechanics, 2010. 43(1): 55-62.
- 9. Engler, A.J., Humbert, P.O. Wehrle-Haller, B., and Weaver, V.M. "Multiscale Modeling of Form and

- Function" Science, 2009. 208: 208-212.
- Sen, S., Engler, A.J., Discher, D.E. "Matrix Strains Induced by Cells: Computing How Far Cells Can Feel" Cell and Mol Bioeng, 2009. 2(1): 39-48.
- 11. Oh, S., Brammer, K.S., Li, Y.S.J., Teng, D., Engler, A.J., Chien, S., and Jin, S. "Stem Cell Fate Dictated Solely by Altered Nanotube Dimension" Proc Nat Acad Sci USA, 2009.106(7): 2130-2135. Adam J. Engler Page 3 of 7 December 2010
- Engler, A.J., Chan, M., Boettiger, D., and Schwarzbauer, J.E. "A Novel Mode of Cell Detachment from Fibrillar Matrix under Shear" J Cell Sci, 2009. 122(10): 1647-53.
- Williams, C.M., Engler, A.J., Slone, R.D., Galante, L., and Schwarzbauer, J.E. "Fibronectin Modulates Mammary Epithelial Cell Proliferation During Acinar Differentiation" Cancer Res, 2008. 68(9) 3185-3192.
- 14. Engler, A.J., Carag-Krieger, C., Johnson, C.P., Raab, M., Tang, H.-Y., Speicher, D.W., Sanger, J.W., Sanger, J.M., and Discher, D.E. "Embryonic Cardiomyocytes Beat Best on a Matrix with Heart-like Elasticity: Scar-like Rigidity Inhibits Beating" J Cell Sci, 2008. 121(22): 3794-3802.
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In vitro cartilage differentiation reveals the risk of oncogenic transformation in human induced pluripotent stem cells.

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Abstract

Induced pluripotent stem cells (iPSCs) are attractive cells for regenerative medicine. However, iPSCs may have the risk of oncogenic transformation due to the use of proto-oncogenes in reprogramming, in addition to the use of viral vectors and random genomic integrations. Indeed, an incident of tumor formation was observed in mouse iPSC-derived chimeras. In this regard, chimera formation is a useful approach for oncogenic potential in mouse iPSCs. Unfortunately, this risk remains unclear for human iPSCs, as a useful indicator has been lacking. What is needed is a useful indicator for evaluating the risk of oncogenic transformation in human iPSCs. Here, we demonstrate how we have discovered a new way to reveal the oncogenic risk of human iPSCs using in vitro cartilage tissue engineering.

In this study, we initially used the human ESC line, H9 and iPSC line, BJ-EOS-4YA, which are derived from the 4 Yamanaka reprogramming factors, Oct3/4, Sox2, c-Myc and KLF4. Following micro-mass chondrogenic differentiation, both human ESCs and iPSCs displayed similar cell morphology. Following 6 weeks of culture, although cartilage specific histological staining and gene expression was present in cartilage derived from both cell types, upon closer inspection the presence of mucous glands/adenocarcinoma-like cysts was detected within iPSC-derived cartilage. The prooncogenic/pluripotency genes, c-Myc and Lin28, were up-regulated in iPSCs in comparison to ESCs. These results indicate that certain human iPSCs may have pro-oncogenic/adenocarcinoma potential and reveal their risks following differentiation into cartilage.

Considering the aforementioned observations, cartilage tissue engineering can be an excellent model for testing human iPSC cell lines in vitro, without the need for transplantation into animals. There are several variations between iPSC lines owing to genomic insertional mutagenesis. Since safety is a foremost issue in human iPSC application, cartilage tissue engineering may provide a useful approach for evaluation of their safety.

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歯と骨の分子疾患科学の国際教育研究拠点 ~デント・メドミクスのインテリジェンスハブ~

第3回 リトリート

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