

Hideaki Suda

1 .Topic in Research Achievements in the Year 2006

Sonic hedgehog (Shh), one of the essential molecules for embryogenesis and organogenesis, is strongly expressed in the enamel knot, which represents the signaling center for odontogenesis due to the presence of essential secretory molecules. Here, we investigated the effects of Shh on ameloblast differentiation using a mouse ameloblast-lineage cell line (ALC). In the presence of Shh, the expression of amelogenin and ameloblastin was up-regulated, and their promoter activities were also elevated. Subcutaneous implantation of Shh-treated ALC into the dorsa of C57/Bl6J mouse caused increased expression of amelogenin and ameloblastin. Forced expression of Gli1, a major transcription factor in Shh signaling, up-regulated both amelogenin and ameloblastin, while Gli1-specific RNAi blocked their expression. These results suggest that Shh directly promotes ALC differentiation, and that Gli1 may be responsible for the signal mediation of Shh.

2 .Publications in the year 2006

○Kawashima N., Wongyaofa I., Suzuki N., Kawanishi H., Suda H.
NK cells and NKT cells in the rat dental pulp tissues.
Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology, 102, 558-563, 2006.

○Kawashima N., Suzuki N., Yang G., Ohi C., Okuhara S., Kawanishi H., Suda H.
Kinetics of RANKL, RANK and OPG expressions in experimentally-induced rat periapical lesions.
Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology 2007 in press.

○Kawashima N., Kawanishi HN., Suda H.
Nitric oxide and pulpal inflammation,
Proceedings of the International Conference on Dentin/Pulp Complex, 2007 in press.

○Takahashi S, Kawashima N, Sakamoto K, Nakata A, Kameda T, Sugiyama T, Katsume K, Suda H.
Differentiation of an ameloblast-lineage cell line (ALC) is induced by Sonic hedgehog signaling, Biochemical and Biophysical Research Communications, 353, 405-411, 2007.

○Yang GY, Kawashima N, Kaneko T, Suzuki N, Okiji T, Suda H.
Kinetic study of immunohistochemical colocalization of antigen-presenting cells and nerve fibers in rat periapical lesions,
Journal of Endodontics, 2007 in press.

Zhang J, Kawashima N, Suda H, Nakano Y, Takano Y, Azuma M.
The existence of CD11c+ and F4/80+ interstitial dendritic cells in dental pulp and their dynamics and functional properties. International Immunology, 18(9), 1375-1384, 2006.

Ebrahim AK, Yoshioka T, Kobayashi C, Suda H.
The effects of file size, sodium hypochlorite and blood on the accuracy of Root ZX apex

locator in enlarged root canals: an in vitro study, *Australian Dental Journal*, 51(2), 153-157, 2006.

Fukumoto Y, Kikuchi I, Yoshioka T, Kobayashi C, Suda H.
An ex vivo evaluation of a new root canal irrigation technique with intra-canal aspiration, *International Endodontic Journal*, 39(2), 93-99, 2006.

Miyai K, Ebihara A, Hayashi Y, Doi H, Suda H, Yoneyama T.
Influence of phase transformation on the torsional and bending properties of nickel-titanium rotary endodontic instruments, *International Endodontic Journal*, 39(2), 119-126, 2006.

Ikeda H, Suda H.
Rapid penetration of lucifer yellow into vital teeth and dye coupling between odontoblasts and neighboring pulp cells in the cat, *Archs Oral Biology* 51, 123-128, 2006.

Wadachi R, Suda H, Hargreaves K.M.
Trigeminal Nociceptors Express TLR-4 and CD14: A Novel Mechanism for Pain due to Infection, *Journal of Dental Research*, 85(1), 49-53, 2006.

Ebrahim AK, Wadachi R, Suda H.
Ex vivo evaluation of the ability of four different electronic apex locators to determine the working length in teeth with various foramen diameters, *Australian Dental Journal*, 51(3), 258-262, 2006.

Ebrahim AK, Wadachi R, Suda H.
Accuracy of three different electronic apex locators in detecting simulated horizontal and vertical root fractures, *Australian Endodontic Journal*, 32(2), 64-69, 2006.

Elmsallati EA, Wadachi R, Ebrahim AK, Suda H.
Debris retention and wear in three different nickel-titanium rotary instruments, *Australian Endodontic Journal*, 32(3), 107-111, 2006.

Myint Myint San, Kataoka H, Hishioka M, Wadachi R, Ebihara A, Suda H.
Differentiation of an ameloblast-lineage cell line (ALC) is induced by Sonic hedgehog signaling, *Endodontic Therapy*, 6(1), 18-18, 2006.

Zhao L, Kaneko T, Okiji T, Takagi M, Suda H.
Immunoelectron microscopic analysis of CD11c-positive dendritic cells in the periapical region of the periodontal ligament of rat molars, *Journal of Endodontics*, 32(12), 1164-1167, 2006.

Ikeda H, Suda H.
Functional syncitium through gap-junctional communication between human odontoblasts, *J Dent Res*, in press, 2007.

Ebrahim AK, Wadachi R, Suda H.
An in vitro evaluation of the accuracy of five different electronic apex locators for determining the working length of retreated teeth, *Australian Endodontic Journal*, in press, 2007.

Ebrahim AK, Wadachi R, Suda H.

Effects of file size and different canal irrigants on the accuracy of Dentaport ZX electronic apex locator in enlarged root canals: an ex vivo study, Australian Dental Journal, in press, 2007.

Kaneko T, Okiji T, Zhao L, Esgeurra R, Suda H.

Heterogeneity of dendritic cells in rat apical periodontitis, Cell and Tissue Research, in press, 2007.

Iwanami M, Yoshioka T, Sunakawa M, Kobayashi C, Suda H.

Spreading of root canal irrigants on root dentine, Australian Endodontic Journal, in press, 2007.

Hayashi Y, Yoneyama T, Yahata Y, Miyai K, Doi H, Hanawa T, Ebihara A, Suda H.

Phase transformation behaviour and bending properties of hybrid nickel-titanium rotary endodontic instruments, International Endodontic Journal, in press, 2007.

Ishimura H, Yoshioka T, Suda H.

Sealing properties of new adhesive root canal filling materials measured by a new dye penetration method, Dental Material Journal, in press, 2007.

Terauchi Y, O'Leary L, Kikuchi I, Asanagi M, Yoshioka T, Kobayashi C, Suda H.

Evaluation of the Efficiency of a New File Removal System in Comparison with Two Conventional Systems, Journal of Endodontics, in press, 2007.

3 . Abstracts in the year 2006

□Kawashima N, Okuhara S, Takahashi S, Sun H, Yang G, Katube K, Suda H.

Is CCN3 (Nov) Signaling Important the Osteogenic Mesenchymal Stem Cell Differentiation? 2006 Autumn Scientific Meeting (The 126th) of Korean Academy of Conservative Dentistry, Nov 24, 2006, Poster, Busan.

□Kawashima N, Wongyaofa I, Suzuki N, Kawanishi-Nakano H, Suda H.

NK and NKT Cells in the Rat Dental Pulp Tissue: Clinical Research. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 15, 2006, Oral, Gyeongju.

□Kawashima N, Okuhara S, Yang G, Katube K, Suda H.

Effects of CCN3 (Nov) Signaling in Osteoblast Differentiation. 84th General Session & Exhibition of the IADR International association for Dental Research, Jun 29, 2006, Poster, Brisbane.

□Kawanishi NH, Kawashima N, Suda H.

Effect of Nitric Oxide on Chemokine Expression in Rat Pulpitis. 84th General Session & Exhibition of the IADR International association for Dental Research, Jun 29, 2006, Poster, Brisbane.

□Okuhara S, Kawashima N, Katube K, Suda H.

Hey1 is a Negative Regulator of Osteoblast Differentiation. 84th General Session & Exhibition of the IADR International association for Dental Research, Jun 29, 2006,

Poster, Brisbane.

□Takahashi S, Kawashima N, Katsube K, Sakamoto K, Yamaguchi A, Suda H. Induction Ameloblast-lineage Cell Line (ALC) Differentiation by Hedgehog Signaling. 84th General Session & Exhibition of the IADR International association for Dental Research, Jun 29, 2006, Poster, Brisbane.

□Ohi C, Kawashima N, Suda H. Tooth Development in Fgf18-deficient Mice. 85th General Session & Exhibition of the IADR International association for Dental Research, March 24, 2007, Poster, New Orleans.

Sasaki H, Suzuki N, Kawashima N, Stashenko P. Key IL-10 Responsive Cells In Amelioration Of Periodontitis. The 35th Annual Meeting & Exhibition of the American Association for Dental Research, Mar 11, 2006, Oral, Miami.

Ebihara A, Fujii N, Yahata Y, Hayashi Y, Miyai K, Suda H. Root Canal Preparation Using Liberator in Simulated Curved Canals. American Association of Endodontists, 2006 annual session, Mar 30, 2006, Poster, Honoruru.

Hayashi Y, Yahata Y, Katsuki T, Miyai K, Ebihara A, Doi H, Yoneyama T, Hanawa T, Suda H. Effect of Pitches on Bending Property of Nickel-Titanium Rotary Endodontic Instruments. American Association of Endodontists, 2006 annual session, Mar 30, 2006, Poster, Honoruru.

Kobayashi C, Suda H. Accumulation of the Strain during Root Canal Preparation. American Association of Endodontists, 2006 annual session, Mar 30, 2006, Poster, Honoruru.

Terauchi Y, Yoshioka T, Suda H. Comparison of the Time Required to Cause Secondary Fracture of Broken Files by Ultrasonic Vibration Under Different Conditions. American Association of Endodontists, 2006 annual session, Mar 30, 2006, Poster, Honoruru.

Wadachi R, Suda H, Hargreaves KM, Helesic G. Trigeminal Nociceptors Express TLR-4 and CD14: Novel Mechanism for Pain Due to Infection. American Association of Endodontists, 2006 annual session, Mar 30, 2006, Poster, Honoruru.

Yoshioka T, Fukumoto Y, Kobayashi C, Suda H. Evaluation of a New Root Canal Irrigation Technique with Intra-Canal Aspiration. American Association of Endodontists, 2006 annual session, Mar 30, 2006, Poster, Honoruru.

Ikeda H, Suda H. Role of intercellular electrical communication in modulating vasomotor tone: Clinical Research. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 15, 2006, Oral, Gyeongju.

Wadachi R, Suda H, Xiaoling S, Hargreaves KM.

A Comparison of Substance P in the Periodontal Ligaments. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 15, 2006, Poster, Gyeongju.

Fukumoto Y, Yoshioka T, Kobayashi C, Suda H.

Intracanal Aspiration Technique for Root Canal Irrigation. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Saegusa H, Watanabe S, Anjo T, Ebihara A, Suda H.

Soft Tissue Ablation by Dental Lasers. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Takeda A, Matsuki Y, Takahashi H, Suda H.

Removal of Intracanal Broken Instruments Using Laser Welding. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Anjo T, Watanabe S, Saegusa H, Ebihara A, Suda H.

Nd:YAG Laser Irradiation in the Root Canal with TiO₂ Solution. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Ebihara A, Fujii Y, Yahata Y, Hayashi Y, Miyai K, Suda H.

Efficacy of Root Canal Preparation by Liberator. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Ebrahim A, Wadachi R, Suda H.

Ex vivo evaluation of the ability of four different electronic apex locators to determine the working length in teeth with various foramen diameters. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Hayashi Y, Yoneyama T, Yahata Y, Katsuki T, Miyai K, Doi H, Ebihara A, Hanawa T, Suda H.

Effect of Nickel-titanium Rotary Instrument Pitches on Root Canal Preparation. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Kobayashi C, Suda H.

Strain of Root Dentin Produced during Mechanical Preparations. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Miyai K, Yoneyama T, Hayashi Y, Ebihara A, Doi H, Hanawa T, Suda H.

Effect of Heat Treatment on the Super-elasticity of Nickel-titanium Instruments. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Wadachi R, Suda H, Xiaoling S, Hargreaves KM.

A Comparison of Substance P in the Periodontal Ligaments. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Yoshioka T, Sudo S, Yoshioka M, Kaneko M, Suda H.
Voids Associated with Gutta-percha in Warmed Gutta-percha Method. 2006 Spring Scientific Meeting (The 35th) of Korean Academy of Endodonitcs, Apr 16, 2006, Poster, Gyeongju.

Anjo T, Watanabe S, Saegusa H, Ebihara A, Suda H.
The Morphological Changes of the Bovine Dentin Surface Irradiated by Er:YAG Laser with Various Contact Tips. The 10th Meeting of the International Society for Lasers in Dentistry, May 18, 2006, Poster, Berlin.

Ebihara A, Watanabe S, Saegusa H, Anjo T, Suda H.
Nd:YAG Laser Irradiation to Dentin Through 150 μ m Diameter Fiber. The 10th Meeting of the International Society for Lasers in Dentistry, May 18, 2006, Poster, Berlin.

Takeda A, Matsuku Y, Takahashi H, Suda H.
Removal of Fine Intracanal Broken Files with Laser Welding. The 10th Meeting of the International Society for Lasers in Dentistry, May 18, 2006, Poster, Berlin.

Ebihara A, Watanabe S, Saegusa H, Anjo T, Suda H.
Application of Er:YAG Laser to Apicoectomy. The 10th Meeting of the International Society for Lasers in Dentistry, May 20, 2006, Oral, Berlin.

Sunakawa M, Kaneko M, Suda H.
MK-801 microinjection reduced the thalamic MD tooth pulp-driven neurons responses. 84th General Session & Exhibition of the IADR International association for Dental Research, Jun 29, 2006, Poster, Brisbane.

Ikeda H, Suda H.
Transjunctional Propagation of Electrical Signals between Fresh Human Odontoblasts. 84th General Session & Exhibition of the IADR International association for Dental Research, Jun 29, 2006, Oral, Brisbane.

Kaneko T, Suda H, Nör JE.
Gene expression analyses of endothelial cells retrieved with laser capture microdissection in tumor angiogenesis. the 19th European Association for Cancer Research meeting, Jul 3, 2006, Poster, Budapest.

Kaneko T, Okiji T, Zhao L, Suda H.
Immunoelectron microscopic analysis of CD11c-positive dendritic cells in the periapical region of the rat periodontal ligament. The Seventh Joint Meeting of the Japan Society of Histochemistry and Cytochemistry and the US Histochemical Society, Aug 25, 2006, Poster, Hawaii.

Kaneko T, Suda H, Nör JE.
Laser Capture Microdissection and RNA Analysis for Factor VIII-expressing endothelial cells in experimentally developed carcinoma. The 16th Microscopy Congress, Sep 4, 2006, Poster, Sapporo.

Kaneko T, Suda H, Nör JE.
Endothelial cells affect tumor progression and tumor cell gene expression. FDI World

Dental Congres, Sep 24, 2006, Poster, Shenzhen.

Kaneko T, Suda H, Nör JE.

The effects of endothelial cells on tumor cell gene expressions. 18th EORTC-NCI-AACR Symposium on "Molecular Targets and Cancer Therapeutics, Nov 8, 2006, Poster, Prague.

Elmsallati EA, Wadachi R, Suda H.

Resistance to Wear of Three Different Nickel-titanium Rotary Instruments: ex vivo Study. 2006 Autumn Scientific Meeting (The 126th) of Korean Academy of Conservative Dentistry, Nov 24, 2006, Poster, Busan.

Sunakawa M, Kaneko M, Suda H.

Microinjection of Mk-801, NMDA Receptor Antagonist, Reduces Thalamic MD Tooth Pulp-driven Neuron Responses. 2006 Autumn Scientific Meeting (The 126th) of Korean Academy of Conservative Dentistry, Nov 24, 2006, Poster, Busan.

Saegusa H, Suda H, Watanabe S, Anjo T, Ebihara A.

Safety of Laser Use under the Dental Microscope. 2006 Autumn Scientific Meeting (The 126th) of Korean Academy of Conservative Dentistry, Nov 24, 2006, Poster, Busan.

Ikeda H, Suda H.

Misdiagnosis of Dental Anormalies Expose Patients to the Risk of Pulp Tooth Loss. 2006 Autumn Scientific Meeting (The 126th) of Korean Academy of Conservative Dentistry, Nov 24, 2006, Poster, Busan.