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Expression analysis of Notch signaling pathway molecules in SHED cultured in keratinocyte growth medium (Article)

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Abstract

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Aim: To detect the expression of molecules associated with Notch signaling pathway in stem cells from human exfoliated deciduous teeth (SHED) cultured in specific differentiation medium, namely, keratinocyte growth medium (KGM). **Methods:** RNA was extracted from SHED harvested on day 1, 3 and 7. RNA was reverse-transcribed to obtain the cDNA and then proceeded with PCR using specific primers for the Notch signaling pathway molecules (Notch1, Jagged-1, Jagged-2 and, Hes1) as well as stem cell marker (Nanog). PCR products were electrophoresed on a 2% agarose gel and stained with SYBR green. **Results:** Notch-1 was highly expressed in SHED cultured in KGM and showed increase in density as the days progressed, while Jagged-1 showed a decrease. Jagged-2 on the other hand, showed a slight increase on day 3 followed by a decrease on day 7. However, Hes-1 was not expressed in SHED cultured in KGM. Nanog showed expression only on day 3 and gradually increased in expression on day 7. **Conclusions:** Notch signaling pathway associated molecules; Notch-1, Jagged-1, Jagged-2, and stem cell marker Nanog are expressed in SHED cultured in KGM which may be involved in the differentiation into epithelial-like cells in human dental pulp tissues.

Author keywords

Culture media [Deciduous](#) [Gene expression](#) [Notch](#) [Receptors](#) [Stem cells](#) [Tooth](#)

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- 1 Miura, M., Gronthos, S., Zhao, M., Lu, B., Fisher, L.W., Robey, P.G., Shi, S.
SHED: Stem cells from human exfoliated deciduous teeth

(2003) *Proceedings of the National Academy of Sciences of the United States of America*, 100 (10), pp. 5807-5812. Cited 1289 times.

doi: 10.1073/pnas.0937635100

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- 2 Nam, H., Lee, G.
Identification of novel epithelial stem cell-like cells in human deciduous dental pulp

(2009) *Biochemical and Biophysical Research Communications*, 386 (1), pp. 135-139. Cited 29 times.
doi: 10.1016/j.bbrc.2009.05.141

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- 3 Cai, X., Gong, P., Huang, Y., Lin, Y.
Notch signalling pathway in tooth development and adult dental cells

(2011) *Cell Proliferation*, 44 (6), pp. 495-507. Cited 10 times.
doi: 10.1111/j.1365-2184.2011.00780.x

[View at Publisher](#)

- 4 Schwanbeck, R., Martini, S., Bernoth, K., Just, U.
The Notch signaling pathway: Molecular basis of cell context dependency

(2011) *European Journal of Cell Biology*, 90 (6-7), pp. 572-581. Cited 61 times.
doi: 10.1016/j.ejcb.2010.10.004

[View at Publisher](#)

- 5 Leong, K.G., Karsan, A.
Recent insights into the role of Notch signaling in tumorigenesis

(2006) *Blood*, 107 (6), pp. 2223-2233. Cited 357 times.
<http://www.bloodjournal.org/cgi/reprint/107/6/2223>
doi: 10.1182/blood-2005-08-3329

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- 6 VanDussen, K.L., Carulli, A.J., Keeley, T.M., Patel, S.R., Puthoff, B.J., Magness, S.T., Tran, I.T., (...), Samuelson, L.C.
Notch signaling modulates proliferation and differentiation of intestinal crypt base columnar stem cells

(2012) *Development*, 139 (3), pp. 488-497. Cited 157 times.
<http://dev.biologists.org/content/139/3/488.full.pdf+html>
doi: 10.1242/dev.070763

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- 7 Karaöz, E., Doğan, B.N., Aksoy, A., Gacar, G., Akyüz, S., Ayhan, S., Genç, Z.S., (...), Sarlboyacı, A.E.
Isolation and in vitro characterisation of dental pulp stem cells from natal teeth

(2010) *Histochemistry and Cell Biology*, 133 (1), pp. 95-112. Cited 90 times.
doi: 10.1007/s00418-009-0646-5

[View at Publisher](#)

- 8 Zhang, X.-P., Zheng, G., Zou, L., Liu, H.-L., Hou, L.-H., Zhou, P., Yin, D.-D., (...), Chen, J.-Y.
Notch activation promotes cell proliferation and the formation of neural stem cell-like colonies in human glioma cells

(2008) *Molecular and Cellular Biochemistry*, 307 (1-2), pp. 101-108. Cited 97 times.
doi: 10.1007/s11010-007-9589-0

[View at Publisher](#)

- 9 Tachikawa, Y., Matsushima, T., Abe, Y., Sakano, S., Yamamoto, M., Nishimura, J., Nawata, H., (...), Muta, K.
Pivotal role of Notch signaling in regulation of erythroid maturation and proliferation

(2006) *European Journal of Haematology*, 77 (4), pp. 273-281. Cited 10 times.
doi: 10.1111/j.0902-4441.2006.t0-1-EJH2708.x

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- 10 Chambers, I., Colby, D., Robertson, M., Nichols, J., Lee, S., Tweedie, S., Smith, A.
Functional expression cloning of Nanog, a pluripotency sustaining factor in embryonic stem cells
(2003) *Cell*, 113 (5), pp. 643-655. Cited 2201 times.
doi: 10.1016/S0092-8674(03)00392-1
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-
- 11 Kim, J.-H., Park, S.-W., Lim, H.-Y., Do, H.-J., Sung, B., Huh, S.-H., Uhm, S.-J., (...), Kim, N.-H.
Regulation of human growth and differentiation factor 3 gene expression by NANOG in human embryonic carcinoma NCCIT cells
(2012) *FEBS Letters*, 586 (19), pp. 3529-3535. Cited 13 times.
doi: 10.1016/j.febslet.2012.08.013
[View at Publisher](#)
-
- 12 Radtke, F., Fasnacht, N., MacDonald, H.R.
Notch Signaling in the Immune System
(2010) *Immunity*, 32 (1), pp. 14-27. Cited 243 times.
doi: 10.1016/j.immuni.2010.01.004
[View at Publisher](#)
-
- 13 Felszeghy, S., Suomalainen, M., Thesleff, I.
Notch signalling is required for the survival of epithelial stem cells in the continuously growing mouse incisor
(2010) *Differentiation*, 80 (4-5), pp. 241-248. Cited 26 times.
doi: 10.1016/j.diff.2010.06.004
[View at Publisher](#)
-
- 14 Mitsiadis, T.A., Graf, D., Luder, H., Gridley, T., Bluteau, G.
BMPs and FGFs target Notch signalling via jagged 2 to regulate tooth morphogenesis and cytodifferentiation
(2010) *Development*, 137 (18), pp. 3025-3035. Cited 38 times.
<http://dev.biologists.org/content/137/18/3025.full.pdf+html>
doi: 10.1242/dev.049528
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-
- 15 Thesleff, I., Mikkola, M.
The role of growth factors in tooth development
(2002) *International Review of Cytology*, 217, pp. 93-135. Cited 177 times.
http://www.elsevier.com/wps/find/bookdescription.cws_home/701003/description#description
doi: 10.1016/S0074-7696(02)17013-6
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-
- 16 HUGO Gene Nomenclature Committee - HGNC
Cited 17 times.
Bethesda: National Center for Biotechnology Information, U.S. National Library of Medicine [cited 2014 Oct 15]
<http://www.ncbi.nlm.nih.gov/gene/4851>
-

- 17 Mitsiadis, T.A., Feki, A., Papaccio, G., Catón, J.
Dental pulp stem cells, niches, and notch signaling in tooth injury.
(2011) *Advances in dental research*, 23 (3), pp. 275-279. Cited 46 times.
doi: 10.1177/0022034511405386
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-
- 18 Mitsiadis, T.A., Henrique, D., Thesleff, I., Lendahl, U.
Mouse Serrate-1 (Jagged-1): Expression in the developing tooth is regulated by epithelial-mesenchymal interactions and fibroblast growth factor-4
(1997) *Development*, 124 (8), pp. 1473-1483. Cited 128 times.
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-
- 19 Zhang, C., Chang, J., Sonoyama, W., Shi, S., Wang, C.-Y.
Inhibition of human dental pulp stem cell differentiation by notch signaling
(2008) *Journal of Dental Research*, 87 (3), pp. 250-255. Cited 34 times.
doi: 10.1177/154405910808700312
[View at Publisher](#)
-
- 20 Your Guide to Understanding Genetic Conditions [Internet]
Bethesda: National Center for Biotechnology Information, U.S. National Library of Medicine [cited 2014 Oct 15]
<http://ghr.nlm.nih.gov/gene/JAK2>
-
- 21 Jarriault, S., Brou, C., Logeat, F., Schroeter, E.H., Kopan, R., Israel, A.
Signalling downstream of activated mammalian Notch
(1995) *Nature*, 377 (6547), pp. 355-358. Cited 1094 times.
doi: 10.1038/377355a0
[View at Publisher](#)
-
- 22 Kageyama, R., Ohtsuka, T., Kobayashi, T.
The Hes gene family: Repressors and oscillators that orchestrate embryogenesis
(2007) *Development*, 134 (7), pp. 1243-1251. Cited 321 times.
doi: 10.1242/dev.000786
[View at Publisher](#)
-
- 23 Kobayashi, T., Kageyama, R.
Hes1 regulates embryonic stem cell differentiation by suppressing Notch signaling
(2010) *Genes to Cells*, 15 (7), pp. 689-698. Cited 40 times.
doi: 10.1111/j.1365-2443.2010.01413.x
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-
- 24 Mitsui, K., Tokuzawa, Y., Itoh, H., Segawa, K., Murakami, M., Takahashi, K., Maruyama, M., (...), Yamanaka, S.
The homeoprotein nanog is required for maintenance of pluripotency in mouse epiblast and ES cells
(2003) *Cell*, 113 (5), pp. 631-642. Cited 2123 times.
www.cell.com
doi: 10.1016/S0092-8674(03)00393-3
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