mentation and points to an optimistic future involving treatment without the need for invasive epidermal grafting.

REFERENCES

1. Lee DY, Park JH, Lee JH, Yang JM, Lee ES. Is segmental vitiligo always associated with leukotrichia? Examination with a digital portable microscope. Int J Dermatol 2009;48: 1262.
2. Taïeb A, Picardo M; VETF Members. The definition and assessment of vitiligo: a consensus report of the Vitiligo European Task Force. Pigment Cell Res 2007;20:27-35.
3. Anbar TS, Westerhof W, Abdel-Rahman AT, Ewis AA, El-Khayyat MA. Effect of one session of ER:YAG laser ablation plus topical 5Fluorouracil on the outcome of short-term NB-UVB phototherapy in the treatment of non-segmental vitiligo: a left-right comparative study. Photodermatol Photoimmunol Photomed 2008;24:322-329.
4. Farajzadeh S, Daraei Z, Esfandiarpour I, Hosseini SH. The efficacy of pimecrolimus 1% cream combined with microdermabrasion in the treatment of nonsegmental childhood vitiligo: a randomized placebo-controlled study. Pediatr Dermatol 2009;26:286-291.
5. Horikawa T, Norris DA, Yohn JJ, Zekman T, Travers JB, Morelli JG. Melanocyte mitogens induce both melanocyte chemokinesis and chemotaxis. J Invest Dermatol 1995;104: 256-259.

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The Expression of Involucrin, Loricrin, and Filaggrin in Cultured Sebocytes

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Dear Editor:

It is well established that a complex interplay of corneocytes and intercellular lipids in the stratum corneum of the skin is responsible for the skin barrier against environmental factors. A cornified cell envelope, which is composed of involucrin, loricrin, filaggrin, and other proteins, is a component of fully differentiated epidermal keratinocytes and corneocytes, and it is important in the skin barrier[1]. Although sebaceous gland sebocytes are considered to originate from the same stem cells as epidermal keratinocyte, it is not clear whether the keratinocyte differentiation markers are expressed in the sebocytes or not[2]. Because the transfollicular route has been known as a major route for drug delivery, more information is required to investigate the expression of the markers in the sebaceous gland sebocytes.

A primary culture of human scalp sebocytes was performed with Dulbecco's modified Eagle's medium (DMEM; Gibco BRL, Grand Island, NY, USA) and Epilife (MEPI500CA; Gibco BRL) according to a method described previously[3]. Sebocytes were cultured at various concentrations of calcium (0.25, 0.5, 1, and 1.2 mM), or treated with vitamin D (10^{-10}, 10^{-9}, 10^{-8}, 10^{-7}, and 10^{-6} M). Reverse transcription polymerase chain reaction (RT-PCR) for invo-

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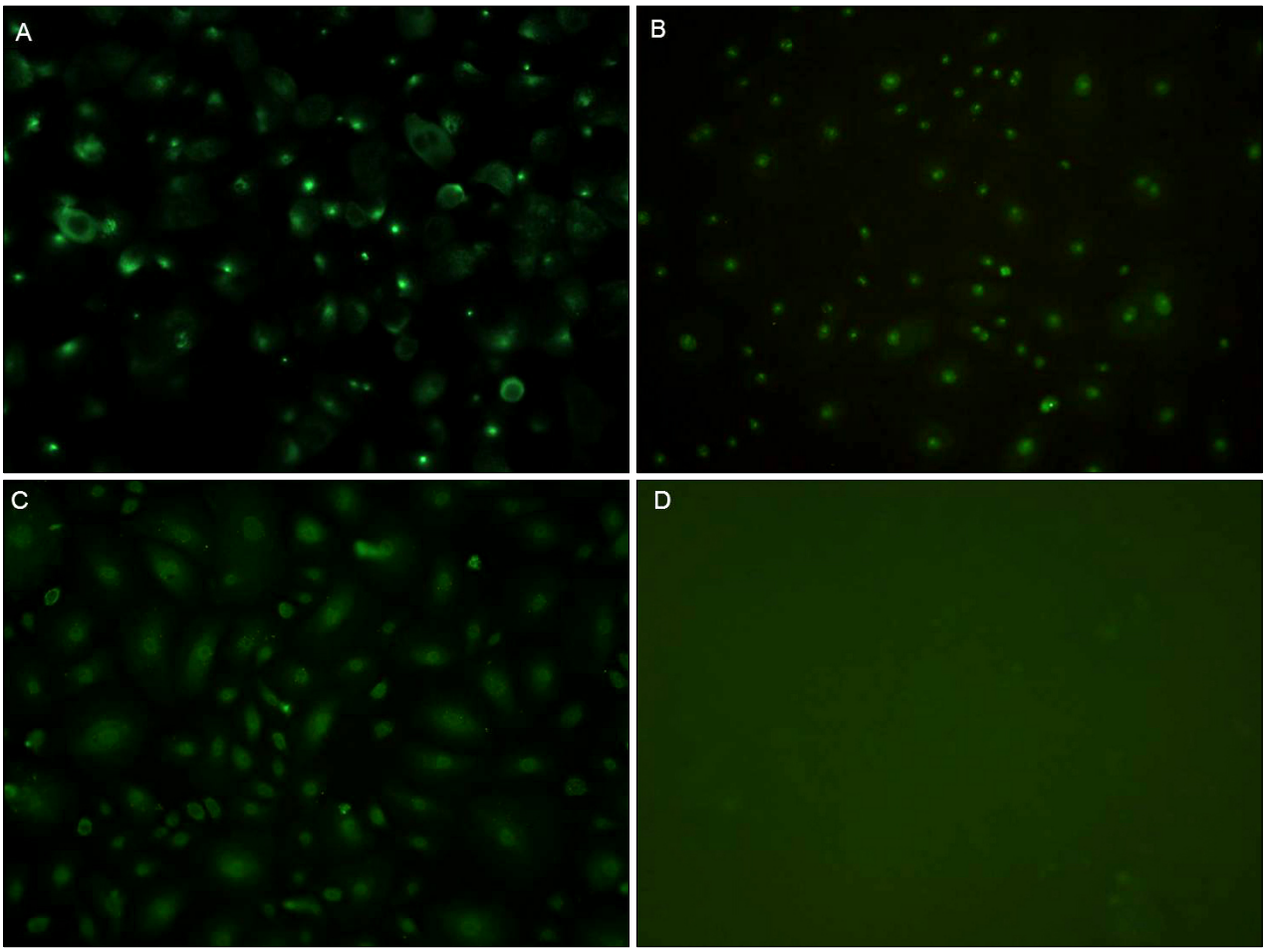

Fig. 1. The expression of involucrin (A), loricrin (B), and filaggrin (C) was very weak in the cytoplasm of cultured sebocytes in immunocytofluorescence. (D) Control (A～D: ×200).

lucrin, loricrin, and filaggrin was conducted in triplicate using the first strand cDNA synthesis kit (Promega, Madison, WI, USA) and oligonucleotide primers (Genotech, Daejeon, Korea). RT-PCR amplification was conducted using the GoTaq Flexi DNA Polymerase: involucrin for 34 cycles at 59°C, loricrin 34 cycles at 69°C, and filaggrin for 30 cycles at 58°C. Immunocytofluorescence for involucrin, loricrin, and filaggrin (Sigma-Aldrich, St. Louis, MO, USA) was also performed on cultured sebocytes.

In this study, it was revealed that the expression of involucrin, loricrin, and filaggrin in cultured sebocytes was very weak (Fig. 1, 2). In addition, their expression in cultured sebocytes was not changed according to calcium concentration or after treatment with vitamin D (Fig. 2).

Sebocytes are highly specialized, lipid-producing epithelial cells that release their contents by a rupture of the cell membrane and cellular degradation during differentiation[4]. Keratinocyte differentiating markers, including involucrin, loricrin, and filaggrin, provide structural support to the cell. Although sebocytes originate from the same stem cells as keratinocytes, it is thought that there are many differences in the expression of keratinocyte differentiating markers in sebocytes. In addition, it is recognized by our previous study (not published) that sebaceous gland sebocytes *in vivo*, both basal proliferating cells and central differentiating cells, show little expression of involucrin, loricrin, and filaggrin. Doran et al.[5] reported that sebocytes did not produce cornified envelopes *in vitro* and could only be induced to produce small quantities (less than 5%) of envelopes with a calcium ionophore. However, Lo Celso et al.[6] observed the presence of cornifin and involucrin positive immortalized sebocytes. This study showed very weak expression of involucrin, loricrin, and filaggrin in the cytoplasm of cultured sebocytes.

Like cultured epidermal keratinocytes, proliferation and differentiation of cultured sebocytes are influenced by extracellular calcium concentration. Vitamin D also induces time- and dose-dependent modulation of cell proliferation

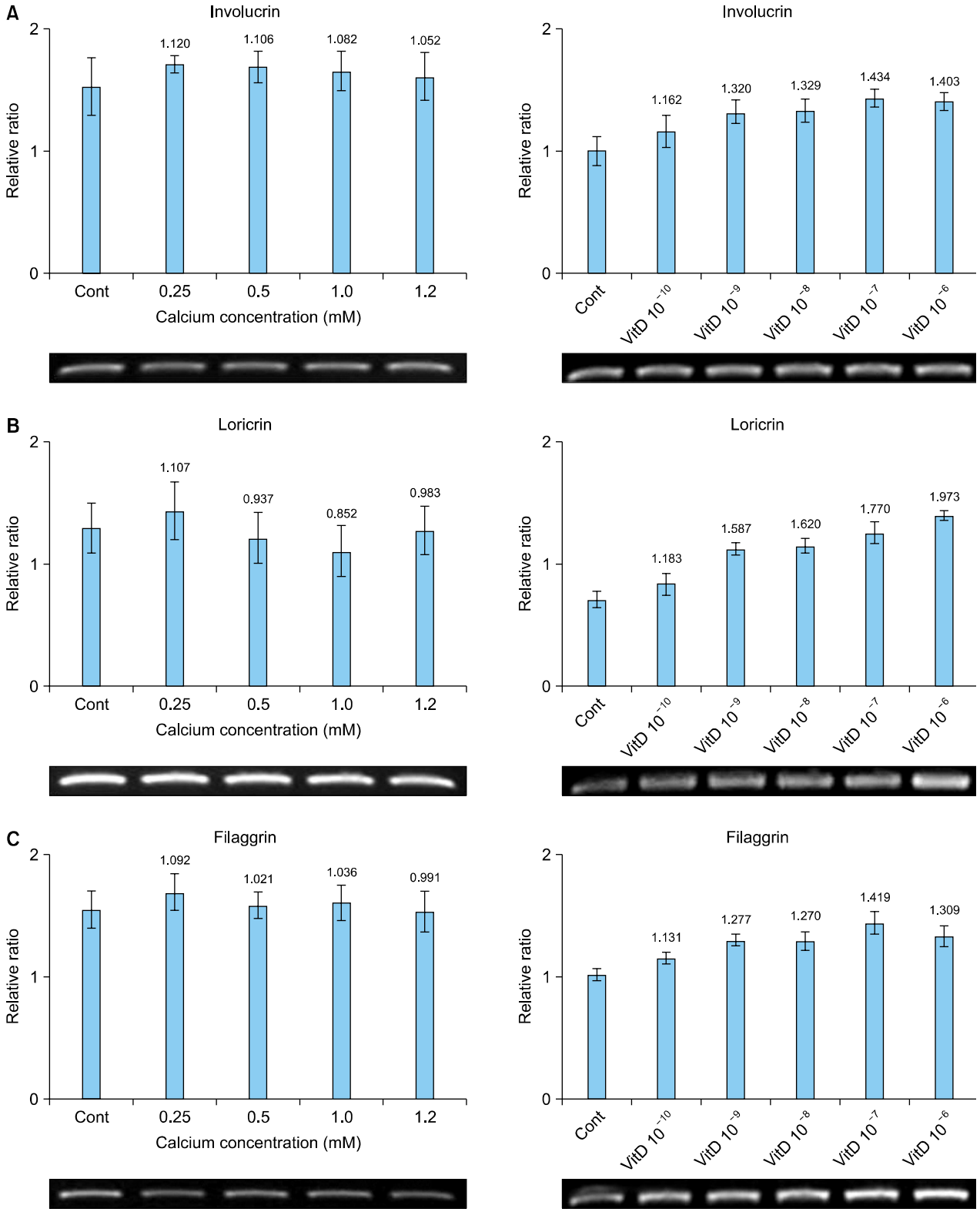

Fig. 2. Gene expression of involucrin (A), loricrin (B), and filaggrin (C) in cultured sebocytes after treatment with calcium and VitD (vitamin D), respectively. Cont: control.

and lipid content in cultured sebocytes through binding to vitamin D receptors. Nevertheless, this study showed that both extracellular calcium concentration and treatment with vitamin D did not affect the expression of involucrin,

loricrin, and filaggrin in cultured sebocytes.
In conclusion, cultured sebocytes showed little expression of keratinocyte differentiation markers. Weak physical barrier in the sebaceous gland may cause much better transfollicular drug delivery.

ACKNOWLEDGMENT

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REFERENCES

1. Steinert PM, Marekov LN. The proteins elafin, filaggrin, keratin intermediate filaments, loricrin, and small proline-rich proteins 1 and 2 are isodipeptide cross-linked components of the human epidermal cornified cell envelope. J Biol Chem 1995;270:17702-17711.
2. Zouboulis CC, Adjaye J, Akamatsu H, Moe-Behrens G, Niemann C. Human skin stem cells and the ageing process. Exp Gerontol 2008;43:986-997.
3. Schneider MR, Paus R. Sebocytes, multifaceted epithelial cells: lipid production and holocrine secretion. Int J Biochem Cell Biol 2010;42:181-185.
4. Zouboulis CC, Xia LQ, Detmar M, Bogdanoff B, Giannakopoulos G, Gollnick H, et al. Culture of human sebocytes and markers of sebocytic differentiation in vitro. Skin Pharmacol 1991;4:74-83.
5. Doran TI, Baff R, Jacobs P, Pacia E. Characterization of human sebaceous cells in vitro. J Invest Dermatol 1991;96:341-348.
6. Lo Celso C, Berta MA, Braun KM, Frye M, Lyle S, Zouboulis CC, et al. Characterization of bipotential epidermal progenitors derived from human sebaceous gland: contrasting roles of c-Myc and beta-catenin. Stem Cells 2008;26:1241-1252.

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Myocardial Infarction in a Patient Treated with Anti-Interleukin-12 Biological Agent for Chronic Plaque Psoriasis

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Dear Editor:
We present the case of a 55 year-old woman affected by psoriasis since she was 40 years old. Her personal history reveals hepatic steatosis, hypertension, dyslipidemia, obesity, and gastro-esophageal reflux disease. She had been smoking 8 cigarettes a day for 30 years and she occasionally consumed alcohol. In 2005, she was treated with Cyclosporine, which was stopped after an episode of

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