

422 Galectin-7 suppresses the erythema and cytokine productions in Nc/Nga mice, an atopic dermatitis model

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Introduction

Exposure of human skin to solar ultraviolet (UV) irradiation inhibits cutaneous acquired immune reactions. Urocanic acid (UCA) is an epidermal chromophore that undergoes *trans* to *cis* isomerization after UVB irradiation (Fig.1). *cis*-UCA is a potent inhibitory modulator of cutaneous acquired immunity, as has been studied in contact hypersensitivity induced through UVB-irradiated skin. However, its underlying molecular mechanisms still remains unclear.

The purpose of this study was to find genes up-regulated in normal human epidermal keratinocytes (NHEK) by *cis*-UCA and to elucidate their biological functions.

Results

1. DNA microarray analysis revealed that *cis*-UCA up-regulated an expression of Galectin-7 (*LGALS7B*) mRNA, encoding a β -galactoside-binding lectin. (Fig.2)
2. Galectin inhibited the production of interleukin (IL)-2 and interferon (IFN)- γ (Fig.3a,b).
3. Galectin-7 injections ameliorated erythema and dermal lymphocytic infiltration in Nc/Nga atopic dermatitis mouse models (Fig.4)

Conclusions

Galectin-7 may play important roles in down-regulating the functions of T lymphocytes after UVB irradiation.

Galectin-7 may be a new therapeutic target for human inflammatory skin diseases in future.

Fig.1 Urocanic acid (UCA) is an epidermal chromophore that undergoes *trans* to *cis* isomerization after UVB irradiation.

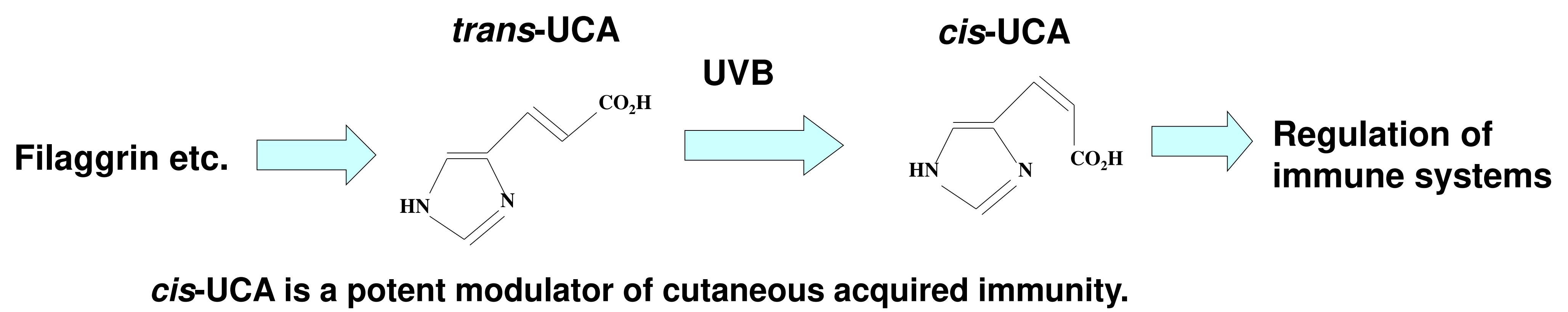
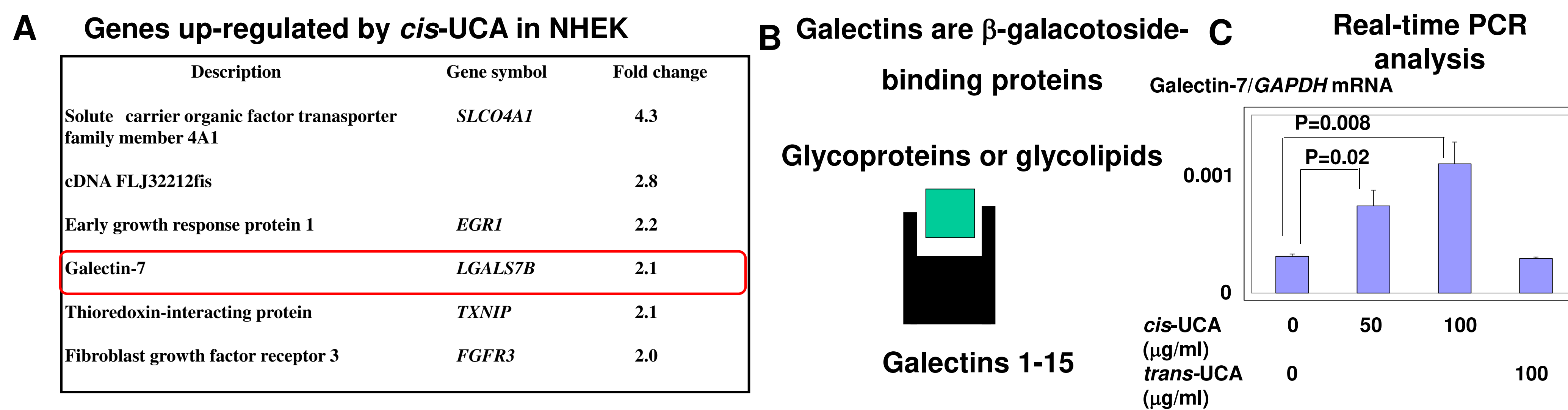
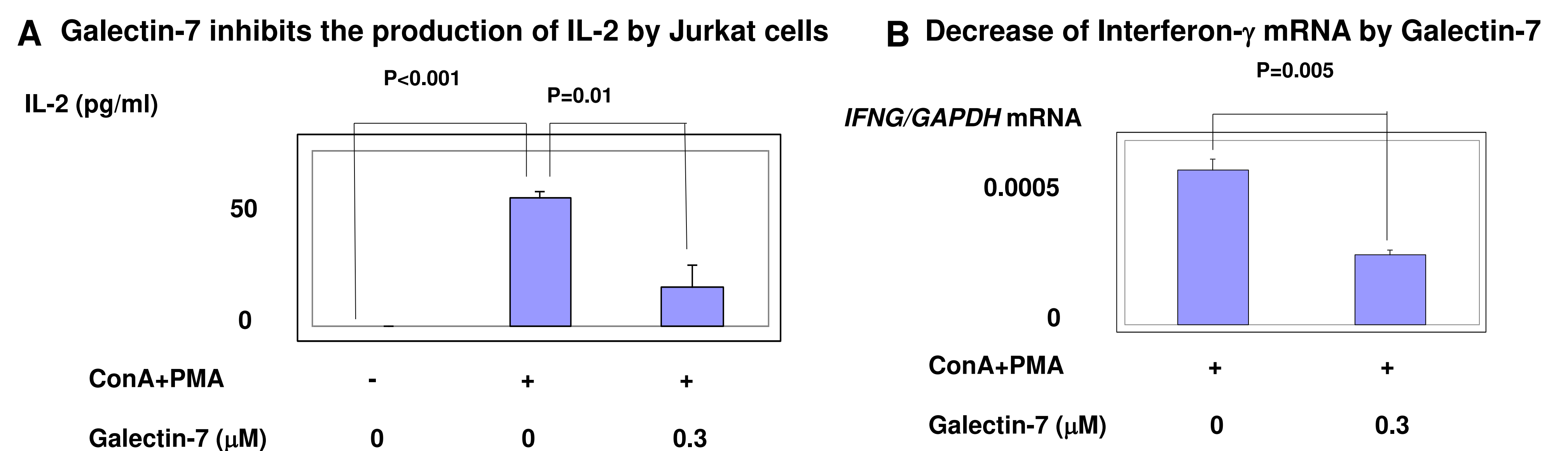


Fig.2 Induction of Galectin-7 mRNA expression, binding protein for glycoproteins and glycolipids, by *cis*-UCA



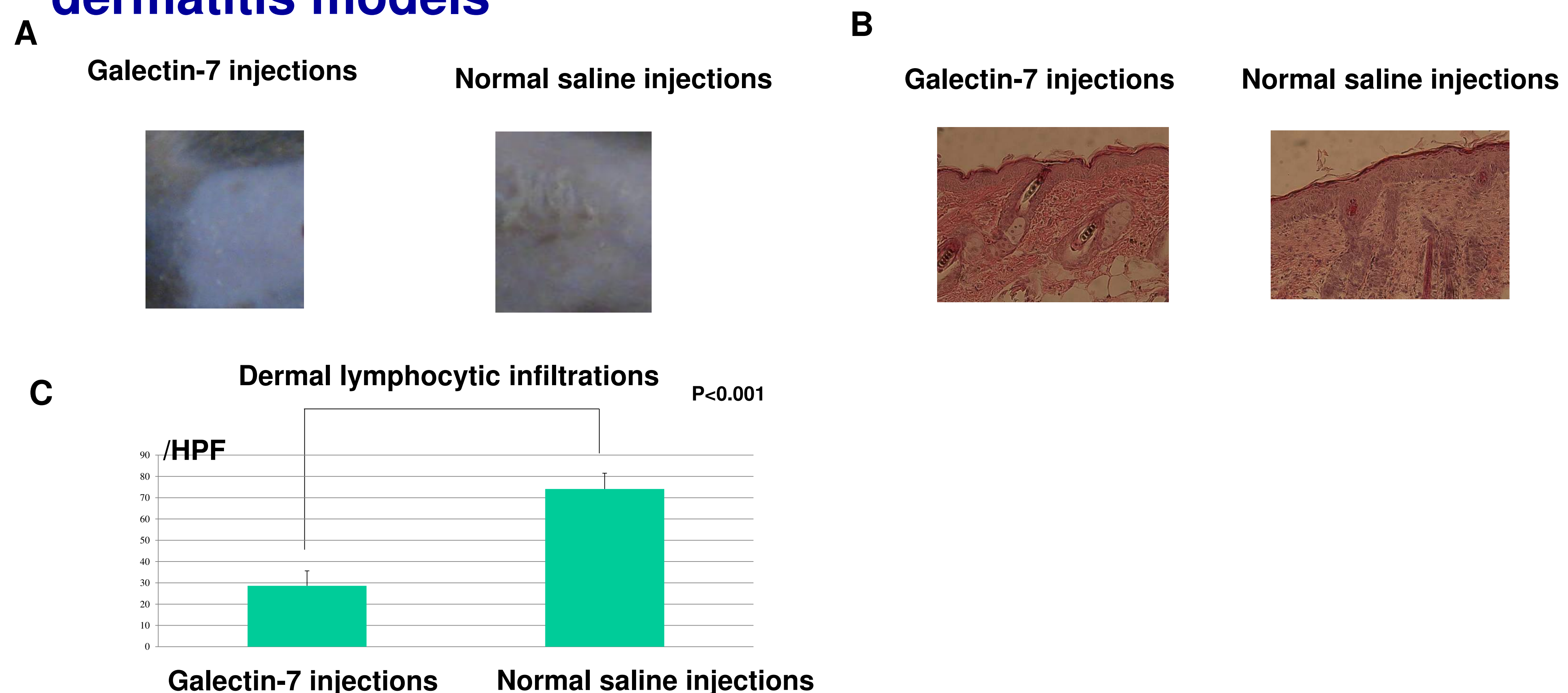
(A) DNA microarray analysis was performed using RNA extracted from NHEK cultured with/without *cis*-UCA. Expression of Galectin-7 (*LGALS7B*) was up-regulated by *cis*-UCA. (B) Galectin-7 is a G-protein coupled receptor, which binds to UDP-glucose. (C) Real-time RT-PCR analysis showed that the expression of Galectin-7 was enhanced only by *cis*-UCA, not by *trans*-UCA. *GAPDH*, glyceraldehydes-3-phosphate dehydrogenase

Fig.3 Galectin-7 inhibits the production of IL-2 and IFN- γ



(A) ELISA-study revealed that recombinant Galectin-7 inhibited the production of IL-2 by ConA+PMA stimulated human T cell line, Jurkat cells. (B) Interferon- γ (*IFNG*) mRNA expression of Jurkat cells was decreased by the addition of recombinant Galectin-7.

Fig.4 Galectin-7 ameliorates the erythema in mouse atopic dermatitis models



(A) Local Galectin-7 injections ameliorated erythema in Nc/Nga atopic dermatitis mouse models.

(B,C) Local Galectin-7 injections decreased the number of dermal lymphocytic infiltrations in Nc/Nga atopic dermatitis mouse models