the heat stress, testicular weights were significantly reduced from 7 days to 21 days, but remarkably recovered after 28days. Severe spermatogenic cell losses were observed on 7-14 days, but began to reduce from 21 days, which appeared a normal shape on 56 days after the heat stress. Cell debris derived from abnormal germ cells began to increase after heat stress and was peak in 14 days in the lumen of cauda epididymis. 3 beta-hydroxysteroid dehydrogenase mRNA level was significantly decreased in 7 and 14 days after scrotal heat stress, but was recovered to normal level after 21 days. Similarly, testicular oxidative damages (MDA level) were gradually increased, were a peak level on 14 days, and then were reduced and maintained a low level after 35 days. The mRNA and protein levels of GPx4 and SOD2 which are expressed in spermatogenic cells specifically were significantly reduced on 7-14 days, but were significantly recovered and promoted after 35 days in testes. On the other hand, after heatexposure, the mRNA levels of apoptotic factors such as Bax, Caspase 3, and Bcl-x_L were significantly changed until 14 days, but were recovered to normal level after 21 days.

Conclusions: These results indicate that spermatogenic disorders by transient scrotal hyperthermia showed a peak level at early periods (7-14 days), but a sequential recovery process was operated after 21 days via endogenous antioxidant defense and anti-apoptotic systems in the reproductive organs.

References

[1] Lue *et al*., 1999; Endocrinology140:1709–1717.
[2] Jung, 2001;Reproduction 121:595–603.
[3] Lue, 2002; JAndrol 23:799–805.
[4] Paul, 2008; MolHum Reprod 14(1):1–8.

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Human Umbilical Cord Blood Mesenchymal Stem Cell-Derived PGE_2 and TGF-β1 Alleviate Atopic Dermatitis by Reducing Mast Cell Degranulation

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Introduction: Mesenchymal stem cell(MSC) is a promising tool for the therapy of immune disorders. However, their efficacy and mechanisms in treating allergic skin disorders are less verified. We sought to investigate the therapeutic efficacy of human umbilical cord blood-derived MSCs (hUCB-MSCs) against murine atopic dermatitis(AD) and to explore distinct mechanisms that regulate their efficacy.

Materials and Methods: AD was induced in NC/Nga mice by the topical application of *Dermatophagoides farinae*. Naïve or activated-hUCB-MSCs were administered to mice, and clinical severity was determined. A β-hexosaminidase assay was performed to evaluate the effect of hUCB-MSCs on MC degranulation.

Results: The subcutaneous administration of nucleotide-binding oligomerization domain 2(NOD2)-activated hUCB-MSCs exhibited prominent protective effects against AD, and suppressed the infiltration and degranulation of mast cells(MCs). NOD2-activated MSCs reduced the MC degranulation via NOD2-COX2signaling. In contrast to bone marrow-derived MSCs, hUCB-MSCs exerted a cell-to-cell contact-independent suppressive effect on MC degranulation through the higher production of prostaglandin E2 (PGE2). Additionally, TGF-β1production from hUCB-MSCs in response to IL-4 contributed to the attenuation of MC degranulation by down-regulating FCεRI expression in MCs.

Conclusions: The subcutaneous local application of NOD2-activated hUCB-MSCs can efficiently ameliorate AD mouse model, and MSC-derived PGE2 and TGF-β1 are required for the inhibition of MC degranulation. Therefore, this study provides novel insight into the field of cell therapy for allergic disease including AD by developing highly effective MSCs and elucidating its interaction with MCs.

References

[1] Kim HS, Shin TH, Lee BC et al. Human umbilical cord blood mesenchymal stem cells reduce colitis in mice by activating NOD2 signaling to COX2. Gastroenterology. 2013;145:1392-1403 e1391-1398.
[2] Seo Y, Yang SR, Jee MK et al. Human umbilical cord blood-derived mesenchymal stem cells protect against neuronal cell death and ameliorate motor deficits in Niemann Pick type C1 mice. Cell transplantation. 2011;20:1033-1047.
[3] Schneider L, Tilles S, Lio P et al. Atopic dermatitis: A practice parameter update 2012. J Allergy Clin Immun. 2013;131:295-+.
[4] Kim HS, Shin TH, Yang SR et al. Implication of NOD1 and NOD2 for the Differentiation of Multipotent Mesenchymal Stem Cells Derived from Human Umbilical Cord Blood. PloS one. 2010;5.

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GPAT Expression by Glucosamine-induced O-linked Glycosylation Prevents mESCs from Hypoxia-induced Apoptosis

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Introduction: Recent researchers reported that O-GlcNAcylation is contributed to regulation of cellular metabolism as well as cell behavior. Moreover, some studies showed glucosamine (2-amino-2-deoxy-D-glucose; GlcN) has a protective role in exposures to noxious extracellular stimuli such as hypoxic condition through the O-linked β-N-acetylglucosamine glycosylation (O-GlcNAcylation). These findings provided evidence that the