ACNE, ROSACEA, AND RELATED DISORDERS (INCLUDING HIDRADENITIS SUPPURATIVA)

ACTIVATION OF ARYL HYDROCARBON RECEPTORS IN HUMAN SEBOCYTES BY PROPIONIBACTERIUM ACNES AND PEPTIDOGLYCAN IN VITRO AND ITS SIGNIFICANCE IN THE PATHOGENESIS OF ACNE

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Background: Acne is a chronic inflammatory skin disease of the human pilosebaceous unit, microbe can induce and aggravate acne, but the exact mechanism still unclear.

Objective: Aryl hydrocarbon receptor (AhR), a ligand-activated transcription factor, was a key member of the family of exogenous signal transduction. AhR not only participated in the regulation of exogenous chemicals toxic metabolism, but also involved in some important biological processes. In our research, by observing the expression of AhR influenced by typical microbe Propionibacterium acnes (P.acnes) and gram positive bacteria bacterial wall peptidoglycan (PGN) in human SZ95 sebocytes in vitro, to investigate the pathogenesis of acne.

Methods: P.acnes and PGN were used to stimulate the sebocytes. CYP1A1 which is the downstream of AhR pathway was detected by qRT-PCR to detect the mRNA expression. Immunofluorescence (IF) and western blot were used to prove nuclear transfer of AhR after activation by P.acnes and PGN.

Results: Both P.acnes and PGN can increase the expression of CYP1A1 mRNA in SZ95 sebocytes, and the increased expression can be antagonized by AhR antagonist CH223191. In addition, AhR protein was significantly increased in nucleus after P.acnes and PGN stimulation but decreased in the cytoplasm. The results of IF were consistent with those of protein expression, and it was verified that both stimuli could induce nuclear transfer of AhR, indicating the activation of AhR by P.acnes and PGN.

Conclusion: P.acnes and PGN can activate AhR in human SZ95 sebocytes. Combined with

our previous research, activation of AhR by P.acnes and PGN may be one of the mechanisms in which microbe induces and aggravates acne and prompt us to further study its significance for the pathogenesis of acne.