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Examining the role of inflammasomes in psoriasis, atopic dermatitis, and contact dermatitis: A Review

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Statement of the Problem: Inflammasomes are intracellular multiprotein complexes that comprise part of the innate immune response. They are composed of three elements; the pattern recognition receptor, an adaptor protein, and a caspase-1 enzyme that results in production of pro-inflammatory cytokines (Dunn et al., 2012). Inflammasome disorders have been linked to an increasing number of diseases. Autoinflammatory diseases refer to disorders in which local factors lead to the activation of innate immune cells, causing tissue damage in the absence of autoantigens and autoantibodies. The purpose of this review is to discuss the involvement of inflammasomes in inflammatory skin conditions such as psoriasis, atopic and contact dermatitis by the production of the interleukin-1 (IL-1) family of cytokines. Findings: The results for contact dermatitis show that inflammasome-dependent secretion of IL-1B, IL-18 and IL-1R cytokines results in T-cell inflammation in sensitized individuals (Li and Zhong 2014, Watanabe et al., 2007, Coehlo de Sa and Nato 2016). Inflammasomes have also been shown to contribute to AD by upregulating the epidermal expression of IL-1B and IL-1RA (Machura et al., 2018, Hay et al., 2012, Kezic et al., 2012). IL-1β and IL-18 also play a key role in psoriasis, as indicated by the involvement of NLRP1, NLRP3 and CARD8 polymorphisms, as well as upregulation of caspase-1 and AIM-2 for cytokine production (Carlstrom et al., 2012, Ekman et al., 2014, Johansen et al., 2007, Dombrowski et al., 2011). Conclusion & Significance: The inflammasome-mediated secretion of IL-1 family cytokines in contact dermatitis, atopic dermatitis and psoriasis implicates the potential role of caspase, NLR and IL-targeted therapy for treatment of inflammatory skin conditions.