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We use this protocol and it's working

Circulating Interleukin-33 Levels in Obesity and Type 2 Diabetes: A Systematic Review and Meta-Analyses

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ABSTRACT

This protocol outlines a systematic review with meta-analyses to comprehensively assess Interleukin-33 (IL-33) levels in
individuals with Type 2 Diabetes (T2D) and obesity compared to healthy controls. Existing literature suggests a potential association between IL-33 and metabolic conditions, but conflicting findings necessitate a systematic evaluation. Expected results will contribute insights into the role of IL-33 in T2D and obesity, guiding future research and clinical implications.

ATTACHMENTS

Protocol for a Systematic Review with MetaA.pdf

GUIDELINES

This systematic review and meta-analyses adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines

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Background

1 Obesity and Type 2 Diabetes (T2D) pose substantial global health challenges, requiring effective interventions [1,2]. While the Interleukin-1 cytokine family, specifically IL-1α and IL-1β, has been extensively studied for its role in associated metabolic dysfunction [3], IL-33, also part of this family, emerges as a promising therapeutic agent influencing inflammation-metabolism interplay. Animal models elucidate IL-33's role in regulating brown adipose tissue, contributing to thermogenesis and overall metabolic health[4]. Human studies reveal lower serum IL-33 levels in lean individuals, suggesting potential implications for obesity and T2D [5].
Despite these insights, a comprehensive evaluation of serum IL-33 levels in metabolic disorders, particularly obesity and T2D, is notably lacking. This systematic review aims to address the question: What is the difference in IL-33 serum levels between individuals with obesity and/or T2D and Healthy Controls (HC)? This review will bridge this gap, providing a critical assessment of existing evidence. By consolidating and appraising the current research landscape on IL-33, this review seeks to enhance our understanding of the underlying mechanisms contributing to these prevalent conditions, ultimately guiding future research and therapeutic strategies.

Methods

2 **Search Strategy Protocol:**

The search will adhere to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Scopus, PubMed, and Web of Science will be selected for their expansive coverage and advanced search capabilities. The

search strategy will utilize both textwords and Medical Subject Headings (MeSH) terms with Boolean logic operators (AND/OR).

Eligibility Criteria Protocol:

To comply with PRISMA reporting guidelines, a robust theoretical framework will guide the article selection process. The research question centers on elucidating the significance of IL-33 levels in individuals with metabolic disorders, emphasizing obesity and T2D. Eligible study designs encompass prospective or retrospective cohort studies, case-control studies, cross-sectional studies, and clinical trials assessing IL-33 levels in individuals with T2D and/or obesity.

Study Records:

During screening, eligibility, and data extraction, studies will be evaluated in duplicate by two independent reviewers. Disagreements will be resolved by involving a third reviewer. Data extraction will be organized in a spreadsheet, and for studies with unclear data representation, authors will be contacted or WebPlotDigitalizer will be utilized.

Quality Assessment and Risk of Bias:

Joanna Briggs Institute (JBI) critical appraisal checklists tailored to specific study designs will be used for the assessment. Checklist responses will be categorized, and the overall methodical quality will be classified as high, acceptable, or low.

Statistical Analysis:

The meta package in RStudio will be used for statistical analysis. Mean differences (MD) will be chosen as the measure of effect, and pooled MD will be calculated using random-effects models to accommodate potential heterogeneity. The heterogeneity of studies will be measured using I-square (I2) and Tau square (Tau2). Forest plots will visually present meta-analytic outcomes.

Sensitivity Analysis Protocol:

Sensitivity analyses, including leave-one-out analyses and fixed-effects model assessments, will be conducted to evaluate robustness.

Publication Bias:

If possible, publication bias will be assessed through funnel plots and asymmetry hypothesis tests (Egger's or Begg's).

References

3 References:

[1] Tiwari A, Balasundaram P. Public Health Considerations Regarding Obesity. 2023.

[2] Chooi YC, Ding C, Magkos F. The epidemiology of obesity. Metabolism 2019;92:6–10. https://doi.org/10.1016/j.metabol.2018.09.005.

[3] Banerjee M, Saxena M. Interleukin-1 (IL-1) family of cytokines: Role in Type 2 Diabetes. Clinica Chimica Acta 2012;413:1163–70. https://doi.org/10.1016/j.cca.2012.03.021.

[4] Bartelt A, Bruns OT, Reimer R, Hohenberg H, Ittrich H, Peldschus K, et al. Brown adipose tissue activity controls triglyceride clearance. Nat Med 2011;17:200–5. https://doi.org/10.1038/nm.2297.

[5] Hasan A, Al-Ghimlas F, Warsame S, Al-Hubail A, Ahmad R, Bennakhi A, et al. IL-33 is negatively associated with the BMI and confers a protective lipid/metabolic profile in non-diabetic but not diabetic subjects. BMC Immunol 2014;15. https://doi.org/10.1186/1471-2172-15-19.