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405 - IDENTIFICATION OF INFLAMMATORY BIOMARKER SIGNATURES IN PREMENOPAUSAL WOMEN IN SPAIN

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Resumen

Background/Objectives: Chronic low-grade inflammation involves multiple interrelated biomarkers, making their joint analysis particularly appropriate. This study aimed to identify biological signatures of inflammation in a cohort of premenopausal women in Spain and to assess the reproducibility of these signatures across relevant population subgroups.

Methods: A cross-sectional study was conducted in 1,173 premenopausal women aged 39-50 years employed by the Madrid City Council, with no inflammatory or autoimmune diseases and no current use of anti-inflammatory medication. Serum concentrations of 16 inflammatory biomarkers were measured, including interleukins (IL-1?, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12p70, IL-17A), chemokines (IP-10, MCP-1), other cytokines (TNF-?, IFN-?, TGF-?1), acute-phase protein (high-sensitivity C-reactive protein, hsCRP) and glycoprotein markers (GlycA, GlycB). Principal component analysis was applied to identify inflammatory signatures. Biomarkers with component loadings > |0.4| were considered to contribute significantly to the signature. Reproducibility among smoking status (smoker/non-smoker), presence of chronic disease (yes/no), and body mass index categories (< 25, 25-29.99, ? 30 kg/m^2) subgroups were examined with coefficients of congruence (CC) between component loadings.

Results: Participants had a mean BMI of 24.2 (SD 4.16); 25.4% were current smokers, 19.2% reported at least one chronic disease, and 8.6% had obesity. Three principal components were identified jointly explaining 63.5% of the total variance (PC1: 40.2%, PC2: 15.2%, PC3: 8.1%). The first component was dominated by interleukins (IL-1?, IL-2, IL-4, IL-6, IL-8, IL-10, IL-12p70, IL-17A), including TNF-? and IFN-?, suggesting a mixed pro- and regulatory-inflammatory profile. The second component was characterized by acute-phase and glycoprotein markers (hsCRP, GlycA and GlycB). The third component was mainly defined by chemokines (IP-10, MCP-1). Inflammatory signatures were highly consistent across subgroups between 0.939 and 1 for all the explored subgroups with CC between 0.94 and 1 for all the explored subgroups.

Conclusions/Recommendations: The identified signatures capture biologically distinct dimensions of inflammation in premenopausal women in Spain. Their consistency across population subgroups supports the reproducibility of these composite measures and their applicability to summarize inflammatory profiles in integrative epidemiological studies on inflammation-related exposures and health outcomes.

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