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**EVOLIUCINĖ MEDICINA:
ŽMOGAUS RAIDOS PERSPEKTYVOS IR SVEIKATA
BESIKEIČIANČIOJE APLINKOJE**

**EVOLUTIONARY MEDICINE:
PERSPECTIVES ON HUMAN DEVELOPMENT AND HEALTH
CONSEQUENCES IN A CHANGING ENVIRONMENT**

Rengėjas:

Vilniaus universiteto Medicinos ir sveikatos mokslų
Doktorantūros mokykla, VU Medicinos fakultetas

Organized by

the Doctoral School of Medicine and Health sciences
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MICROPLASTIC-LIKE PARTICLES IN HUMAN PLACENTA: PRELIMINARY FINDINGS FROM SEM-EDX ANALYSIS

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Background and Aim: Plastic degradation generates microplastics, which have become ubiquitous environmental contaminants detected in air, food, drinking water, and numerous ecosystems worldwide. Increasing evidence suggests that micro- and nanoplastics can accumulate in human tissues, including blood and placenta and have been associated with adverse biological effects, including inflammation, oxidative stress, and reproductive toxicity. Their detection in placental tissue raises concerns regarding potential maternal and fetal exposure and highlights the need for further investigation of their occurrence during pregnancy. The aim of this study was to investigate the presence of microplastic-like particles in human placental tissue samples using scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX).

Materials and Methods: Placental tissue samples were collected following delivery and processed under conditions minimising external contamination. Selected placental fragments were examined using high-resolution scanning electron microscopy (SEM). Particles identified based on their morphology were further analysed using energy-dispersive X-ray spectroscopy (EDX) to determine their elemental composition. Particles showing elemental profiles compatible with synthetic polymer materials were classified as suspected microplastic particles.

Results: SEM analysis revealed the presence of multiple microparticles embedded within placental tissue. Morphological assessment identified irregularly shaped particles of varying sizes. Subsequent EDX analysis demonstrated elemental compositions characterised predominantly by carbon-rich signatures and low levels of inorganic elements, consistent with a potential synthetic origin. Several particles were therefore considered highly suggestive of microplastic-like material within placental tissue.

Conclusions: Microplastic-like particles were detected in placental tissue samples using SEM and EDX analyses. The observed morphological features

and elemental composition were consistent with particles of potential synthetic origin. These findings highlight the feasibility of placental tissue analysis for investigating prenatal exposure to environmental contaminants and warrant further studies using polymer-specific methods to confirm particle identity.

Keywords: environmental contaminants, microplastics, placenta, placental tissue, SEM-EDX