

COMPARISON OF PLASMA cell-free DNA EXTRACTION METHODS AND PERSPECTIVES OF ITS POTENTIAL USE IN HUMAN TOXICOLOGY

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INTRODUCTION: Cell-free DNA (cfDNA) is found in extracellular compartments such as blood, saliva, urine, as results of apoptosis, necrosis and/or secretion. The cfDNA consists principally of uniform fragments of 150 to 200 bp that are found circulating in the fluids. Its potential application has been demonstrated in the diagnosis and prognosis of human disease such as cancer, when differential levels of cfDNA, known as circulating tumor DNA (ctDNA), are found in blood plasma. However, the effects of toxicants (DNA damage) can be confounding factors to quantify cfDNA in these diseases; moreover, in recent years the usefulness of cfDNA environmental and occupational health in the context of human toxicology, has been proposed. **OBJECTIVE:** To compare methodologies using columns and magnetic beads for cfDNA extraction in human plasma. **MATERIALS AND METHODS:** Peripheral blood samples were collected of apparently healthy persons and patients with neoplastic disease. The samples were collected in EDTA vacutainer tubes, the plasma extracted and processed for cfDNA. The kits NucleoSpin™ Plasma XS (columns) and MagMAX™ Cell-Free DNA Isolation (magnetic beads) were used, following the manufacturer instructions. The methods were applied to each sample and repeated twice. Quantification was performed with the Quantus fluorometer system (Promega). **RESULTS:** The results indicate with the column method a concentration of cfDNA $\bar{x} \pm DE = 0.049 \pm 0.002$ ug/uL for healthy individuals and 0.061 ± 0.017 ug/uL in patients with neoplasia. With the magnetic bead method, $\bar{x} \pm DE = 1.045 \pm 0.078$ ug/uL for healthy and 0.914 ug/uL in patients. **CONCLUSION:** The methodologies used for extraction of plasma cfDNA show differences in the quantification, possibly due to the retention nature of DNA fragments, between other factors. Preliminary, we suggest the simultaneous use of both methods for the utility in diseases and environmental and occupational health in human toxicology studies.

KEYWORDS: cfDNA, cancer, human toxicology, DNA extraction.