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Editorial

Plastics Exposure and Urological Issues

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There are millions of tons of unrecycled plastic litters in lands and oceans. Resistant to degradation, these can remain for several hundred years or longer, burdening future generations [1]. Data regarding the hostile effects of plastics and their derivatives are accumulating; however, much is still unknown. The toxic effects of plastics come from their elemental components, such as lead, cadmium, and mercury. The by-product components of plastics, such as phthalates are known carcinogens or endocrine disruptors.

These compounds have been linked to hepatocellular carcinoma, breast cancer, and urological malignancies. As the downstream effects of plastics in the human body become better understood, some studies have proposed possible mechanisms by which they exert their effects in urological malignancies. The synthetic monomer used in the lining of many goods such as cans and water bottles, acts as a potent Estrogen Receptor (ER) agonist.

In the USA, 90% of the population are exposed, making it one of the most common plastic derivatives to which humans are exposed.

interaction has been well studied in uterine and ovarian cancers, but some studies have now begun to clarify its role in prostate cancer.

The mechanism of their action in prostate cancer has also been studied using human prostate cancer cell lines, suggesting a possible mechanism and role in prostate cancer. In addition, they can interact with androgen deprivation therapy, which is the mainstay of treatment in locally advanced or metastatic prostate cancer.

Unlike prostate cancer, urothelial carcinoma is caused by various environmental exposures, including an association with vinyl, a plastic derivative. Similarly, in Renal Cell Carcinoma (RCC) and testicular cancers, data regarding the associations between plastics and these malignancies are scarce. However, some early data have considered the possible effects of plastic derivatives on renal function and progression to Chronic Kidney Disease (CKD) in animal models.

A research provided both qualitative and quantitative evidence of the microplastics presence as well as their properties, types, and abundance in paired para-tumor and tumor samples of human prostate [2].

Further study explored the health associations between MP (Microplastics) and the prostate organ. Study findings revealed that at least four microplastic types are absorbed into prostate tissue following consumption. Notably, participant behavioral investigations revealed frequent utilization of packaged drinking water and take-out food, suggesting potential MP exposure routes and highlighting the safer food packing alternatives [3].

Another research provided both qualitative and quantitative evidence of the microplastics presence as well as their properties, types, and abundance in paired para-tumor and tumor samples of human prostate. Correlations between microplastics abundance, demographics, and clinical characteristics of patients need to be further validated in future studies with a larger sample size [2].

There is a growing concern about the potential burden of microplastics on human organs and tissues, investigated by microRaman spectroscopy the presence of microplastics in human kidneys and urine was checked. Healthy portions of ten kidneys obtained from nephrectomies, as well as ten urine samples from healthy donors were analyzed: 26 particles in both kidney and urine samples were identified, with sizes ranging from 3 to 13 μm in urine and from 1 to 29 μm in kidneys. The most frequently determined polymers are polyethylene and polystyrene, while the most common pigments are hematite and Cu-phthalocyanine. This preclinical study proves the presence of microplastics in renal tissues and confirms their presence in urine, providing the first evidence of kidney microplastics deposition in humans [4].

Further results suggest that microplastics caused mitochondrial dysfunction, Endoplasmic Reticulum (ER) stress and inflammation [5].

In summary, as prevention is better than cure, safer food packing alternatives should be used. Reduction of overall plastic consumption through ambitious targets and the use of alternatives to standard plastic products are recommended.

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