

# Micro and Nano Plastics Movement in Body



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### Abstract

Micro and Nano plastic body movement studies are in the early stages of research without many data. However, studies on rats, clams, and fish have shown that the smaller the particle, the more likely it is to be absorbed and remain in the body. When small plastic particles are introduced into cells, they dissolve in macrophages, which can secondarily reach other organs of the human body, such as the liver, kidney, heart, and brain, so more research is necessary.

**Keywords:** Micro & nano plastic; Body movement; Cell accumulation; Cell absorption

**Abbreviation:** PET: Positron Emission Tomography

## Introduction

Attention on micro and Nano plastics is rapidly increasing due to the increase in use in the Era of Covic-19. Accordingly, researches on micro and Nano plastics are more active. Micro and Nano plastic are present in all aspects of human life such as air, water, and soil due to the use of plastics [1]. In addition, since humans ingest micro and Nano plastics, movement and risk are very important [2] This review shortly summarizes intake, movement, and excretion of micro and Nano plastics in the body. In vivo studies of microplastics are currently being conducted, and it is known that microplastics have been found in human feces in more than 20 papers [3]. In particular, it has been confirmed that Nano plastics with small particles remain in the body without being discharged [4]. When Nano plastics are absorbed into the human body, the following hypotheses can be established as to how they are adsorbed and not excreted.

Endocytosis is the process of absorbing foreign substances by the formation of vesicles with a size of about 0.1 $\mu$ m when the membrane site is depressed in the cell, and nano plastics can be adsorbed. Phagocytosis is formed by fusion of the pseudopodal cell membrane, which is an extended structure of the cytoplasm and can contain abnormal substances during formation, so Nano plastics can be adsorbed. Transcytosis refers to the process in which substances absorbed by endocytosis and phagocytosis are secreted out of the cell again. At this time, Nano plastics may not be adsorbed or secreted. Persorption is the inflow of solid particles

from the gastrointestinal tract into the circulatory system through the monolayer epithelium at the tip of the villus and can adsorb up to 130 $\mu$ m of microplastics.

Deng et al. [5] confirmed that microplastics (5 $\mu$ m and 20 $\mu$ m) accumulated in the tissues, liver, kidneys, and intestines of mice, and confirmed that the size of microplastics is an important variable [5]. Body-Malapel et al. (2020) suggested in many animal experiments that microplastics intake interferes with essential intestinal functions, such as intestinal barrier function and regulation of gut microbiota [6]. Kang et al. (2021) observed that microplastics were inserted into mice and observed for 46 hours, but it was confirmed by PET imaging that a large amount of microplastics remained in the body [7]. As such, micro and Nano plastics with small particles can remain in the body, and microplastics can be adsorbed into the body according to many activities such as endocytosis, phagocytosis, Transcytosis, and Persorption.

## Conclusion

The harmfulness and movement of micro and Nano plastics to the human body is currently in the early stages of research and is a field that requires a lot of research in the future. A large portion of microplastics are excreted out of the body through excretion, but micro and Nano plastics that are not excreted can cause problems in the body's metabolism, so a lot of research is

necessary. Because of their hydrophobicity in the human body, Nano plastics can penetrate many parts of the body, including the blood, brain barrier, stomach, and lungs. The introduced plastics can be transferred to the liver, kidney, spleen, heart, and brain through macrophages. The human risk with micro and Nano plastics is a field that has not been studied much at present, so it is not possible to conform clearly about the toxicity of plastics. However, it is clear that the smaller the size of the plastic, the more it can accumulate in the human body.

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