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Professor Kihong Park's research team successfully created a toxicology database for sources of ultrafine dust affecting Korea

□ GIST (President Seung Hyeon Moon) Professor Kihong Park of the School of Earth Sciences and Environmental Engineering has successfully created a toxicology database for sources of ultrafine dust * affecting Korea.

- The researchers measured the physico-chemical characteristics of various ultrafine dusts. Through various toxicity tests, they constructed a database of the toxicities and the sources of ultrafine dust in Korea.

* Ultrafine dust: particle size of 2.5 μm or less

□ This research has developed a new ultrafine dust risk factor that surpasses the simple concentration index and provides the basis for providing more detailed ultrafine dust information to the public.

□ At present, in Korea, the mass concentration * index (simple weight) of ultrafine dust is predicted based on the simple weight. However, even with the same mass concentration, it can show completely

different health hazards depending on the kind of ultrafine dust. In other words, some ultrafine dust particles have completely different constituents and even the same amount can greatly change the risk to humans.

* Mass concentration: value that shows how much the relevant ingredient is contained in a certain mass or volume

- Professor Kihong Park's research team has constructed an all-in-one system, including a measurement system that can identify various physico-chemical properties of the manufacturing system capable of generating various ultrafine dusts and a diagnostic system that can evaluate various toxicities.

- In the case of toxicity, various biological/chemical reactions such as cytotoxicity *, Genotoxicity ** (DNA damage and mutagenesis), oxidative stress ***, and inflammation reaction **** were detected by ultrafine dust type. As a result of comparison with average toxicity values, diesel particulate emissions were most toxic, followed by gasoline vehicle emissions, crops, and pine wood burning coal particles.

* Cytotoxicity: toxicity to cells

** Genotoxicity: damages cell's genetic material

*** Oxidative stress: damage caused by reactive oxygen species

**** Inflammation reaction: biological reactions to harmful stimuli of biological tissues to inhibit early cell damage and to regenerate tissue while removing wounded necrotic cells and injured tissue

- The toxicity database of the source of ultrafine dust can be used to create a new risk assessment index by adding to the simple concentration index for ultrafine dust in the atmosphere.

- This achievement is meaningful in that it has achieved substantial results as a result of various convergence studies based on more than five years of basic research.

- Professor Kihong Park said, "Currently, simple mass concentration of ultrafine dust is not sufficient to capture the exact health impact. In the future, people will constantly demand more accurate and detailed ultrafine dust information. In order to meet the needs of the public and secure substantial research results, it is urgent to support continuous and long-term convergence research so that researchers can avoid the burden of quantitative short-term performance."

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