



**National Research
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**Professor Eunji Lee's research team uses harmful
carbon dioxide to develop a therapeutic hydrogel
(National Research Foundation of Korea)**

- Techniques have been developed to use carbon monoxide, a known toxic gas, as a treatment. According to the National Research Foundation of Korea (President Jung-hye Roh), GIST (President Seung Hyeon Moon) Professor Eunji Lee has developed a hydrogel * patch that can control the amount and rate of carbon monoxide emission. By easily attaching to organs and tissues, it and has been shown to be effective in protecting cells and has anti-inflammatory effects.

* Hydrogel: a gel in which the liquid component is water

- Excessive carbon monoxide can block oxygen supply to the body's tissues and affect the central nervous system, leading to headache, vomiting, and even death. On the other hand, a small concentration of 10~500 ppm inhibits inflammation and protects against vascular relaxation, cell damage, and death.

- Although efforts have been made to use carbon monoxide as a therapeutic agent using these advantages, it has not been easy to process carbon monoxide at a suitable concentration in the desired location. Existing techniques release carbon monoxide rapidly from plasma, which causes a significant reduction in the therapeutic effect or has toxic side effects.
- The team combined a biocompatible peptide * with a carbon monoxide-releasing molecule to induce a reticulated form of nanofibers. This successfully produced hydrogel gel patches that can control carbon monoxide emissions.

* Peptide: short chains of amino acid monomers linked by amide bonds

- In particular, the hydrogel patches have modified peptide components that improves its physical strength and adhesion with affected parts, improving the transfer of the carbon monoxide gas and its therapeutic effect.
 - Molecular programming can also control the amount and rate of carbon monoxide emission. It also inhibited apoptosis and inflammatory response by preventing the formation of reactive oxygen species that induce deformation of intracellular genes or proteins.
- Professor Eunji Lee said, "This is the first example of a practical hydration gel patch that can be used as a therapeutic agent by controlling the amount and release rate of carbon monoxide. This is expected to contribute greatly to the development of gas treatment products that can be effectively applied to specific tissues or organs."
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