

Team discovers control of cell signaling using a cobalt (III)-nitrosyl complex

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Professor Jaeheung Cho (front left) -- Professor Daeha Seo (front right), and research team in the Department of Emerging Materials Science. Credit: DGIST

Two professors' joint research team has discovered how to synthesize new materials to deliver nitric oxide, which controls the cell activation

signal. The cell signaling control is expected to contribute positively to the development of treatment for cardiovascular diseases.

DGIST announced on June 24 that Professor Jaeheung Cho and Professor Daeha Seo's research teams in the Department of Emerging Materials Science developed a stable cobalt(III)-nitrosyl complex and confirmed the changes of the signal transmission path of [nitric oxide](#) inside the cells.

Nitric oxide controls cell activities by delivering various biochemical information including vasodilation, immune system control, and signal transmission. However, scientists haven't been able to clarify the details concerning nitric oxide delivery to cells due to difficulties in controlling and regulating its movement, although they have assumed nitric oxide movement to cells occurs.

To identify this, the research team synthesized a cobalt(III)-nitrosyl complex on their own, enabling additional research on nitric oxide by shedding light on it and moving nitric oxide to a desired place at a desired time. As a result, the research team confirmed differences in the delivery kinetics of nitric oxide to various paths in and outside the cells. The difference of delivery speed observed by the research team is expected to greatly impact the development of treatments in the future. If used well, a desired chemical reaction can occur at a desired time in a certain cell, enabling necessary treatment. This can be applied to various areas since it is related to the development of a 'prodrug,' which becomes effective in a specific area that requires treatment.

Professor Jaeheung Cho said "We highly look forward to developing a prodrug that effectively supplies nitric [oxide](#) to a necessary area or time. By expanding our research to animal behavior and [human body](#). We plan to develop treatment for cardiovascular diseases related to vasodilation and enhancement of nueroplasticity."

More information: Sangwon Shin et al, Artificial Control of Cell Signaling Using a Photocleavable Cobalt(III)-Nitrosyl Complex, *Angewandte Chemie International Edition* (2019). [DOI: 10.1002/anie.201903106](https://doi.org/10.1002/anie.201903106)

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