Chemical Selective Precision Optical-Control of Biomolecules

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Categories:
- Chemistry and Chemical Analysis

Keywords:
- Chemical Imaging
- Chemistry and Chemical Analysis
- Laser Scanning
- Precision Control

Researchers at Purdue University have developed a scanning-laser-based technology for real-time precision control of molecular activities and chemical processes in live cells. Current technologies do not allow for automated and selective control of laser-target interactions based on chemical compositions. The Purdue technology automatically detects optical signals from biological molecules to trigger the control laser beam in real-time; the control laser beam is only activated at the pixels when the chemical-selective optical signals are sensed. This technology functions in real-time and effectively controls molecular targets in highly-dynamic living samples. It can be integrated with fluorescence or other types of laser scanning microscopes.

Technology Validation: The technology has diffraction-limited image resolution and opto-control precision (200-500 nm). Chemical-selective signals from fluorescence or Raman can be used to trigger the opto-control laser beam. The response time of the feedback loop is ~20-30 ns.

Advantages
- Fully-automated
- Real-time
- Suitable for living samples
- High chemical selectivity
- Digital logic functions for decision making

Applications
- Microscopy
- Optogenetics
- Controlled release
- Biochemistry
- Cell biology

- Photodynamic therapy

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Intellectual Property:

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