High-throughput Synthesis, Screening, and Bioanalysis Automated Platform for Identifying Drugs

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Categories:
- Chemistry and Chemical Analysis
- Pharmaceuticals

Keywords:
- Bioassay
- Chemistry and Chemical Analysis
- Mass Spectrometry
- Opioids
- Pharmaceuticals

Researchers at Purdue University have developed a high-throughput automated platform for synthesizing, reaction screening & analysis of drug candidates. The drug discovery process is expensive and time-consuming, requiring years to develop a commercial drug. This can be attributed to the manual, fragmented steps in the process. Purdue researchers have developed an automated sample-handling system that synthesizes and analyzes libraries of chemical compounds and then runs biological assays on the synthetic compounds. The system can screen 6,144 reactions in one hour at ultra-small quantities ("make-to-measure"), allowing the analysis of many reaction conditions to select the optimal conditions for producing the purest product. The system conducts analysis via desorption electrospray ionization mass spectrometry (DESI-MS). The reactions occur in the flying microdroplets generated by DESI and the resulting products are either identified by MS or deposited for enzymatic/receptor assays for cytotoxicity and bioactivity. For high-interest candidate compounds, the synthesis spray process can be scaled up.

Technology Validation: The researchers' system can screen 6,144 reactions in one hour and can screen cytotoxicity and bioactivity at a rate of 384 samples per hour.

Advantages:
-Automated
-High-throughput
-Fast
-Identifies ideal reaction conditions
-Make-to-measure

Applications

-Identifying and evaluating non-addictive pain medication and high-potency overdose reversal treatment
-Creating databases of synthetic opioids not yet introduced onto the streets

People:

- Cooks, Robert Graham (Project leader)
- Morato Gutierrez, Nicolas Mauricio

Intellectual Property:

Application Date: November 7, 2022
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