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by Aileen Constans

TOOLS AND TECHNOLOGY

GFT NMR Proves Its Structural Genomics Mettle

G-matrix Fourier transform (GFT) NMR, a technique developed several years ago for rapid collection of nuclear magnetic resonance data, has been used to determine the structures of eight proteins in less than a month.1

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G-matrix Fourier transform (GFT) NMR, a technique developed several years ago for rapid collection of nuclear magnetic

resonance data, has been used to determine the structures of eight proteins in less than a month.[1] "People usually work for many months for one structure. And even a year is not unusual," says coauthor Thomas Szyperski of the University of Buffalo. [see related story, page 36]

The work demonstrates for the first time that GFT NMR works on a "real world" scale, meaning a protein concentration of 1 mM and proteins up to 22 kD in size, says biophysical chemist Xiaolian Gao of the University of Houston.

High-dimensional NMR experiments require sampling from indirect dimensions, which increases instrument run times. In GFT NMR, however, several indirect dimensions are sampled simultaneously, dramatically speeding up resonance assignment data acquisition. To make the process more high-throughput, the researchers combined it with simultaneous heteronuclear NOESY

data acquisition.

Automated data analysis is the next challenge. But coauthor Guy Montelione of Rutgers University says GFT NMR affords at least one advantage for software developers: It generates patterns that are characteristic of the type of experiment that was run, which can help researchers distinguish whether peaks are real or artifactual. "This allows you to move deeper into the noise of the spectrum and to pick weaker peaks by looking for the characteristic patterns," says Montelione.

He adds, "One of the breakthroughs here of this paper is that it demonstrates in a very convincing way that NMR can play a major role in high-throughput structural genomics."

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References

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