Chemistry researchers develop metal complexes to study cancer

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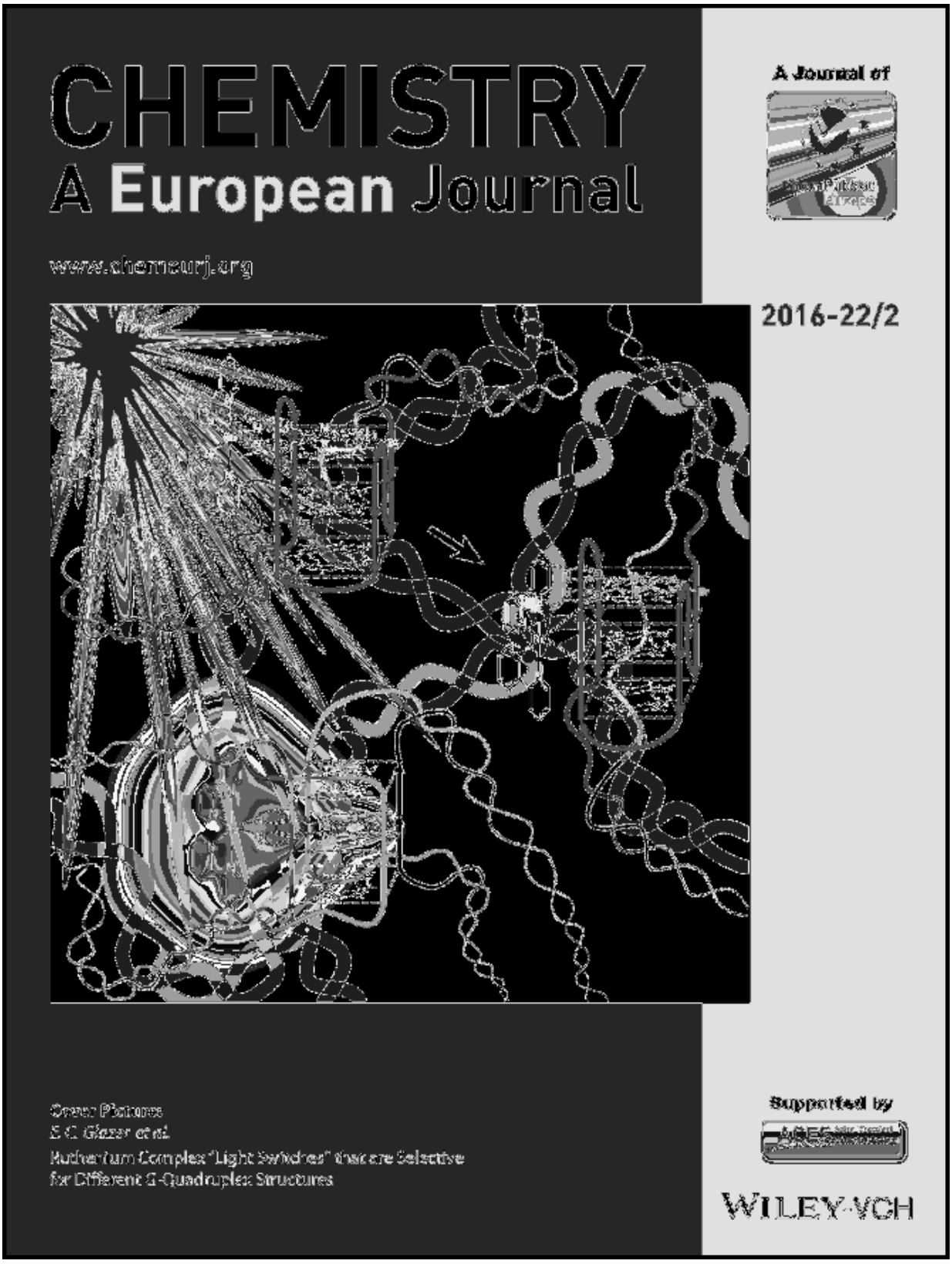
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Cover Pictures
S. C. Glazer et al.
Ruthenium Complex "Light Switches" that are Selective
for Different G-Quadruplex Structures
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University of Kentucky Department of Chemistry researchers Edith Glazer, Sean Parkin and students Erin Wachter and Diego Moyá recently published a study showing that specialized compounds containing the metal ruthenium may be able to visualize or damage specific DNA structures relevant for cancer.

Published in *Chemistry - A European Journal*, the work was named a "Hot Paper" for its importance in a rapidly evolving field of high interest, and was highlighted with the back cover.

The ends of chromosomes and some genes associated with cancer have regions where DNA can form unusual structures known as G-quadruplexes, of which there are several subtypes. For cancer cells to continue growing and dividing, they need to untangle these G-quadruplex structures. Researchers have long thought it would be possible to halt tumor growth if there was a way to lock these G-quadruplex structures in place.

Graduate students Erin Wachter and Diego Moyá synthesized ruthenium-containing compounds they thought might bind and stabilize G-quadruplex structures. They designed these potential drugs to act as "light switches" so they would only give a response when bound to G-quadruplex structures. Using a rapid screening approach, they found two compounds that were exquisitely specific for distinct G-quadruplex structure subtypes. Out of 32 biomolecules they tested, two different G-quadruplexes showed the greatest response to the ruthenium compounds.

In collaboration with Parkin, they used X-ray crystallography—a technique that allows researchers to determine the chemical structure of

molecules—to investigate the structural differences in the two complexes that could relate to the differences in selectivity.

"It's pretty rare to have molecules that recognize or damage specific DNA structures," Glazer said. "Most molecules prefer [the more common] double helix DNA and the selectivity within different subclasses of molecules is really unusual."

In the future, derivatives of these compounds may be used to visualize or damage cancer cells.

Provided by University of Kentucky