TECHNOLOGY

# Anticancer Compounds Targeted at Secondary DNA Structures

## OVERVIEW

Background

While the structure of DNA is most commonly associated with the double helix, research has shown that DNA can adopt many secondary structures for which the biological functions are still being determined. One secondary structure, the G-quadruplex, can form when the double helix unwinds during transcription. One common area for the formation of a G-quadruplex is at the end of DNA strands in a region called the telomere. Telomeres form at the end of DNA strands to protect them from degradation as a decrease in DNA strand length would eventually lead to cell death. Telomere length is maintained in the cell by an enzyme called telomerase, and over activity of telomerase is observed in ~85% of cancers. In addition to telomeres, G-quadruplex formation is associated with many known proto-oncogenes such as c-myc and c-kit. G-quadruplex binding compounds are known, but many lack specificity for G-quadruplex formations and also bind duplex DNA structures, which can lead to increased toxicity during treatment. Therefore, a compound that specifically binds G-quadruplex formations could hold great potential as a new anti-cancer agent.

Innovative technology

Researchers at the University of Maryland have discovered that a drug currently used to treat some forms of protozoan infection in animals binds to G-quadruplex formations. Through further testing, they were able to identify the structural components of the drug that were necessary to bind G-quadruplex formations. With this information, they synthesized derivatives that have increased specificity for G-quadruplex formations. These high specificity derivatives may prove to be useful anti-cancer agents. Additional experiments have shown the compounds to be effective inhibitors of numerous kinases associated with cancers, most notably FLT-3, a kinase linked to AML. The lead compound in the series can also inhibit PARP in excess of 50% at non-toxic doses suggesting these compounds may possess three mechanisms of action for cancer treatment.

## APPLICATIONS

· Cancer treatment

## ADVANTAGES

· Potential new class of drugs for cancer treatment
· High specificity for G-quadruplex formations may decrease cellular toxicity

## CONTACT INFO

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## Additional Information

### INSTITUTION

University of Maryland, College Park

### PATENT STATUS

Pending

### LICENSE STATUS

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### CATEGORIES

- Small molecules

### EXTERNAL RESOURCES

- US Patent 10,130,625

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