Light activated anticancer drug targeted to DNA using cisplatin like sub-units

March 27 2006

One of the most effective chemotherapy drugs against cancer is cisplatin because it attaches to cancer DNA and disrupts repair. However, it also kills healthy tissue. Many scientists are creating alternative drugs or cisplatin analogs in attempts to find treatments without side effects. One approach to analog development is light activated drugs, or photodynamic therapy (PDT).

Now a Virginia Tech chemistry-biology research team that has been working on both non-cisplatin drugs and cisplatin analogs has combined their findings to create a molecular complex (supramolecule) that exploits cisplatins tumor targeting to deliver a light activated drug.

The latest results from the group's research to create a DNA targeting, light activated anticancer drug was presented at the 231st American Chemical Society national meeting in Atlanta on March 26-30.

Chemistry professor Karen J. Brewer reports that the group has developed supramolecular complexes that combine light-absorbing PDT agents and cisplatin like units. Previous anticancer molecules created by the group have contained platinum-based molecules that bind DNA. They have also developed new light activated systems able to photocleave DNA. This report combines these two approaches to target the drug to DNA using cisplatin like units, directing the light activation to tumor cells and the sub-cellular target, DNA.

"In the past, our light activated systems had to find the DNA within the

cell, an often inefficient process. Now we have added the DNA targeting drug," Brewer said. "We were working on cisplatin analogs before, so we have tied it to light activated systems."

Cisplatin begins its interaction with cancer DNA by binding to the nitrogen atoms of the DNA bases, typically guanine. Our new supramolecules use this nitrogen-binding site to hold the light activated drug at the target until signaled to activate. Thus the new supramolecules can be delivered to the tumor site but remain inert until activated by a light signal. Light waves in the therapeutic range – that is, those that can penetrate tissue, are used to activate these new drugs. The researchers are also appending other molecules that emit UV light to track the movement of these drugs within cells.

Source: Virginia Tech

Citation: Light activated anticancer drug targeted to DNA using cisplatin like sub-units (2006, March 27) retrieved 25 June 2024 from https://phys.org/news/2006-03-anticancer-drug-dna-cisplatin-sub-units.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.