# BIOEN 530: UW LIBRARIES SUPPORT FOR BIOENGINEERING GRADUATE STUDENTS

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## UW Libraries Support for Bioengineering Grad Students

### Bioen 530: Literature Analysis: Home Important Tools for Grad School & Beyond . Current Awareness Alerts Set up automated searches to catch new articles on topics important to you · Journal Tables of Contents Monitor new issues of selected journals Citation Managers Organize your references and PDFs. Automatically format your citations when writing. Class Slides - October 3, 2016 Librarian Presentation Contact Your Bioengineering Librarians We're happy to help you with: Research Strategies and Database Searching Literature Reviews Current Awareness Alerts . Using Citation Managers . Tracking Down Difficult-to-Find Information or Publications 🔼 Diana Louden and 🔼 Christina Byrne

### **Key UW Resources for Bioengineering Graduate Students**

#### BIOENGINEERING RESEARCH GUIDE

- · Portal to recommended research resources in Bioengineering
- · Article databases, technical reports, reference books, & research tips

#### MATCHING YOUR RESEARCH QUESTION TO A LITERATURE DATABASE

- · Biomedical research and clinical care? Try PubMed.
- Engineering articles, conference papers, standards, and technical reports? Try IEEE or Engineering Village (Compendex & INSPEC).

Search this Guide

Search

- · Chemistry and biotechnology articles and patents; chemical and material properties? Try SciFinder.
- · Citation chasing across the scientific literature (who cited this paper?): Try Web of Science.

#### DOCUMENT DELIVERY SERVICE





- In article databases, look for a purple "UW Article Online" icon. If there isn't one, click on the "Check for Full Text" icon. You will be
  led either to the online version of the article or to a document request form. The library's document delivery service will send you a
  copy free of charge.
- . Customize PubMed to show UW full-text links by modifying settings in your My NCBI account.
- Customize Google Scholar to show UW full-text links by modifying settings in your Google account.

#### OFF-CAMPUS ACCESS

- When off-campus, use library links to databases (including PubMed) and journals. You will be prompted to log in with your UW NetID so you will have access to all UW subscriptions.
- · Consider setting up Husky OnNet for off-campus access.

#### RESEARCH COMMONS

- . Get help with writing, designing posters & presentations, and using citation managers.
- Participate in Scholars' Studio and practice giving a 5-minute presentation for your peers.
- · Stay current with Research Commons events.

http://guides.lib.uw.edu/hsl/bioen530



Allen Library South — 1<sup>st</sup> floor http://www.lib.washington.edu/commons

- Writing consultations for grad students
- Citation management help
- Design help desk
- Graduate Funding Information Service
- Scholars' Studio

### Finding Scientific Literature

- Use the <u>Bioengineering Research Guide</u> to identify key subject databases for your topic.
- What do you want to know? Think about both the subject and types of publications.
  - Peer-reviewed journal articles? Technical reports? Material properties? Lab protocols? Books?
- Understand structured databases vs. Google Scholar
  - Structured databases give you access to universes of literature not easily found by Google
  - Structured databases get rid of the "noise"

## Databases for Finding Scientific Literature

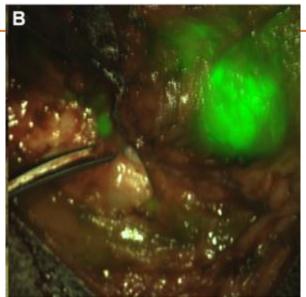
What Are You Looking For?	Recommended Databases
Biomedical research or clinical care articles	<u>PubMed</u>
Engineering articles, conference publications, & other technical publications	Compendex and Inspec (Engineering Village)
Chemistry and biotechnology articles, patent publications	SciFinder Register for an account first.
Cited reference searching across a wide range of subjects	Web of Science

See the <u>Bioengineering Research Guide</u> for many more databases and other resources. Contact your bioengineering librarians for assistance.

BLZ-100 is the first Tumor Paint product candidate that is being developed for cancer surgery in multiple solid tumor types. BLZ-100 is a drug administered by IV injection that circulates within the body and "light ups" cancer cells. It consists of an Optide, which binds and internalizes into cancer cells, and a fluorescent dye, which emits light in the near-infrared range.

Preclinical utility of BLZ-100 has been demonstrated in a wide range of cancer types, including brain, breast, prostate, lung, colorectal, skin, and sarcomas. BLZ-100 is currently in multiple Phase 1 clinical trials.

**BLZ-100** 



Blaze has an ongoing collaboration with the Fred Hutchinson Cancer Research Center focused on the discovery and development of Optide-based products for use as guided therapeutics.

\* Optides, or "optimized peptides," are tiny molecules originally derived from natural organisms, such as scorpions, violets and sunflowers and optimized for drug-like properties in the research laboratory.

### Searching for Drugs, Devices, & Diagnostics

- Description of technology, molecular structure, or mechanism of action
  - tumor-targeting fluorescent imaging agent;
  - chlorotoxin-indocyanine green imaging agent;
  - chlorotoxin-Cy5.5 bioconjugate for intraoperative visualization of cancer foci
- Lab code BLZ-100; CyTP 007
- CAS Registry Number 1673565-40-6
- Nickname Tumor Paint
- Non-proprietary (generic) name tozuleristide
- □ Proprietary (brand) name N/A

### Research Article

### Tumor Paint: A Chlorotoxin:Cy5.5 Bioconjugate for Intraoperative Visualization of Cancer Foci

2007 article by inventor

Mandana Veiseh, <sup>1</sup> Patrik Gabikian, <sup>2</sup> S-Bahram Bahrami, <sup>1</sup> Omid Veiseh, <sup>3</sup> Miqin Zhang, <sup>23</sup> Robert C. Hackman, <sup>14</sup> Ali C. Ravanpay, <sup>18</sup> Mark R. Stroud, <sup>1</sup> Yumiko Kusuma, <sup>1</sup> Stacey J. Hansen, <sup>1</sup> Deborah Kwok, <sup>1</sup> Nina M. Munoz, <sup>1</sup> Raymond W. Sze, <sup>5</sup> William M. Grady, <sup>636,11</sup> Norman M. Greenberg, <sup>1</sup> Richard G. Ellenbogen, <sup>29</sup> and James M. Olson <sup>1,67,83</sup>

'Clinical Research Division, Fred Hutchinson Cancer Research Center; Departments of 'Neurosurgery, 'Material Science, 'Pathology, 'Radiology, 'Medicine, and 'Pediatrics, and 'Program in Neurobiology and Behavior, University of Washington; 'Children's Hospital and Regional Medical Center; and 'Puget Sound Health Care System, Seattle, Washington; and "Cancer Biology Department, Vanderbilt University Medical School, Nashville, Tennessee

### Nonclinical Profile of BLZ-100, a Tumor-Targeting Fluorescent Imaging Agent

Julia Parrish-Novak<sup>1</sup>, Kelly Byrnes-Blake<sup>2</sup>, Narine Lalayeva<sup>3</sup>, Stefanie Burleson<sup>4</sup>, Janean Fidel<sup>5</sup>, Rhonda Gilmore<sup>6</sup>, Pamela Gayheart-Walsten<sup>6</sup>, Gregory A. Bricker<sup>6</sup>, William J. Crumb Jr<sup>7</sup>, K. S. Tarlo<sup>8</sup>, Stacey Hansen<sup>1</sup>, Valorie Wiss<sup>5</sup>, Errol Malta<sup>9</sup>, William S. Dernell<sup>5</sup>, James M. Olson<sup>10</sup>, and Dennis M. Miller<sup>1,9</sup>

International Journal of Toxicology 2017, Vol. 36(2) 104-112 © The Author(s) 2017 Reprints and permission: sagepub.com/journalsPermissions.nav DOI: 10.1177/1091581817697685 journals.sagepub.com/home/ijt

(\$)SAGE

2017 article by inventor & Blaze scientists



### $3^{rd}$ most "relevant" paper out of $\sim 27,500$ documents

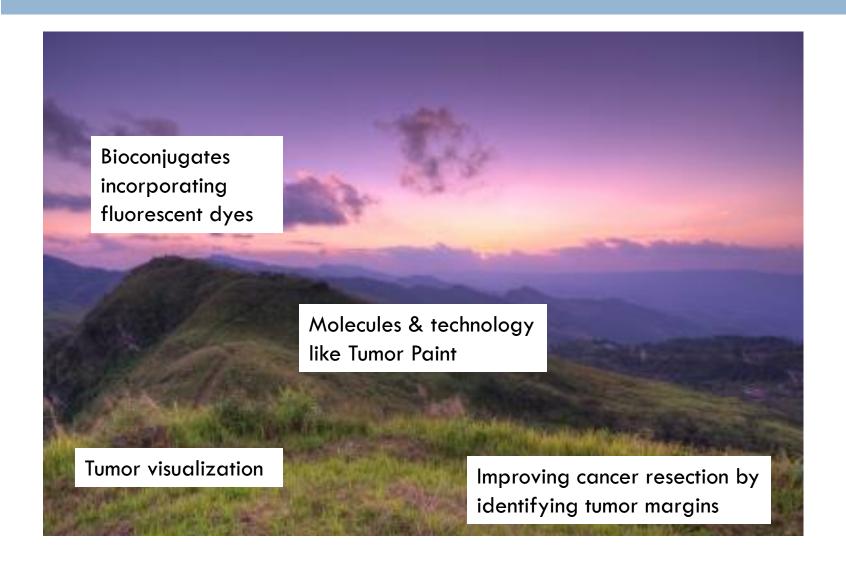
### Tributyltin or triphenyltin inhibits aromatase activity in the human granulosa-like tumor cell line KGN

M Saitoh, T Yanase, <u>H Morinaga</u>, M Tanabe... - Biochemical and ..., 2001 - Elsevier ... of the dog-whelk, Nucella lapillus, caused by imposex induced by tributyltin from antifouling **paints**. ... Establishment and characterization of a steroidogenic human granulosa-**like tumor** cell line, KGN that ... 2001, The Journal of Steroid Biochemistry and **Molecular** Biology more. ...

☆ 99 Cited by 149 Related articles All 9 versions

How to find something when you don't know exactly what you're looking for?

### Evaluating the Research Landscape



### Identify the Concepts You Care About

I want to review the literature to find molecules and techniques for using fluorescence for the intraoperative visualization of solid tumors.

- a fluorescent dye
- intraoperative visualization of cancer cells
- more precise, complete resection of solid tumors

### Keyword Generation for your Concepts

 Fluorescence, fluorescent, fluorogenic, beacon, dye, visualization, indocyanine green (name of an FDAapproved dye used in diagnostics)

Cancer, tumor, carcinoma, glioblastoma

Surgery, surgical, resection, intraoperative

### Defining What You're Looking For: Creating a Keyword Search Strategy

**AND** and **OR** tell the database to combine keywords in a particular way.

AND = returns results that include ALL of the keywords/criteria (narrows the search)

cancer AND surgery

**OR** = returns results that meet AT LEAST ONE of the keywords/criteria (broadens the search) cancer OR tumor OR carcinoma

### Defining What You're Looking For: Creating a Search Strategy

- Quotation Marks (") e.g., "cancer surgery"
  - tell the database to look for this exact phrase. It's literal!
    - "cancer surgery" ≠ "cancer surgeries"
- Asterisk (\*) e.g., detect\*
  - lets you search for variations of words.
     detect\* captures detect, detects, detecting, detection
- □ Parentheses () e.g., (cancer OR tumor) AND surgery
  - used in your strategy to organize groupings of words and how they're combined.

## Searching for a Combination of 3 Concepts: (1)beacon; (2) cancer; and (3) surgery

(fluoresc\* OR fluorogen\* OR dye OR dyes OR beacon\* OR visuali\* OR "indocyanine green")

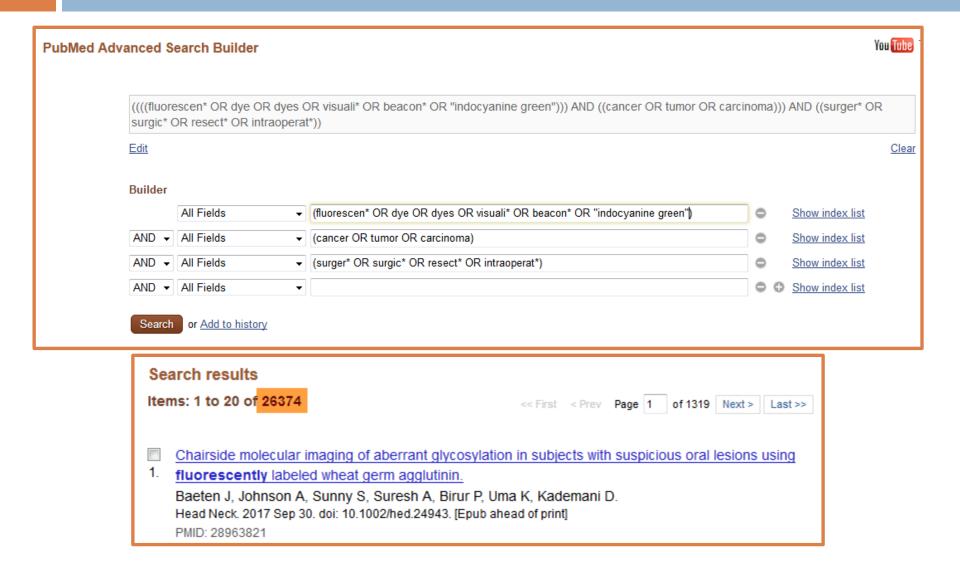
AND

(cancer OR tumor OR carcinoma)

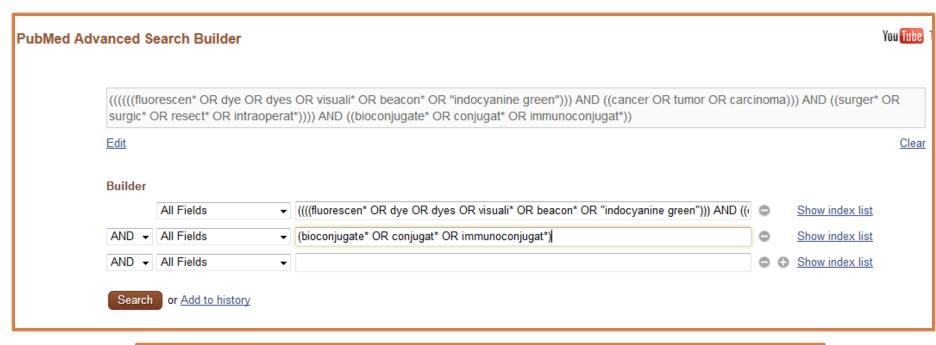
AND

(surger\* OR surgic\* OR resect\* OR intraoperat\*)

### Using PubMed Advanced Search



### Search Refinement

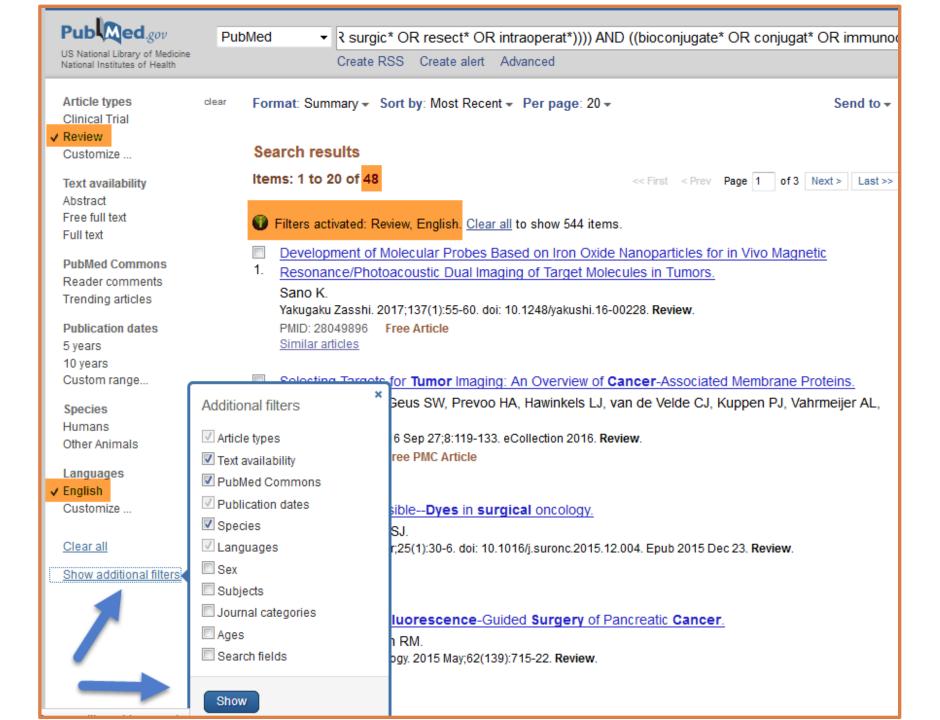


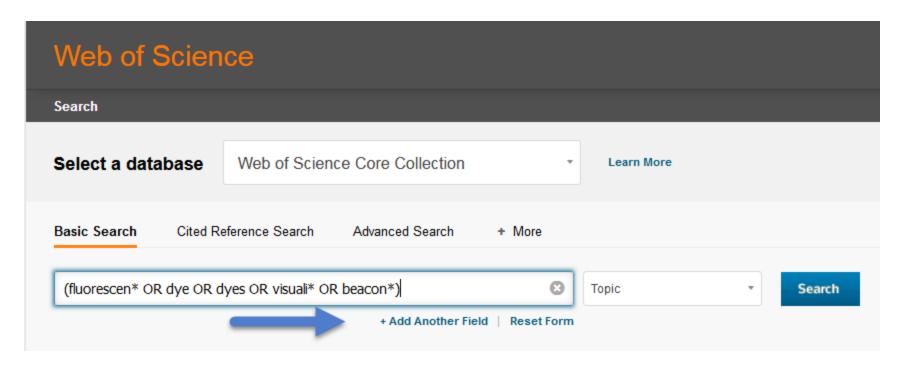


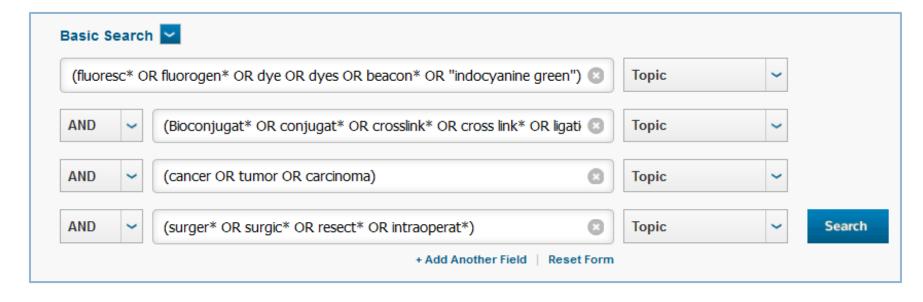
### Use Filters to Refine Results

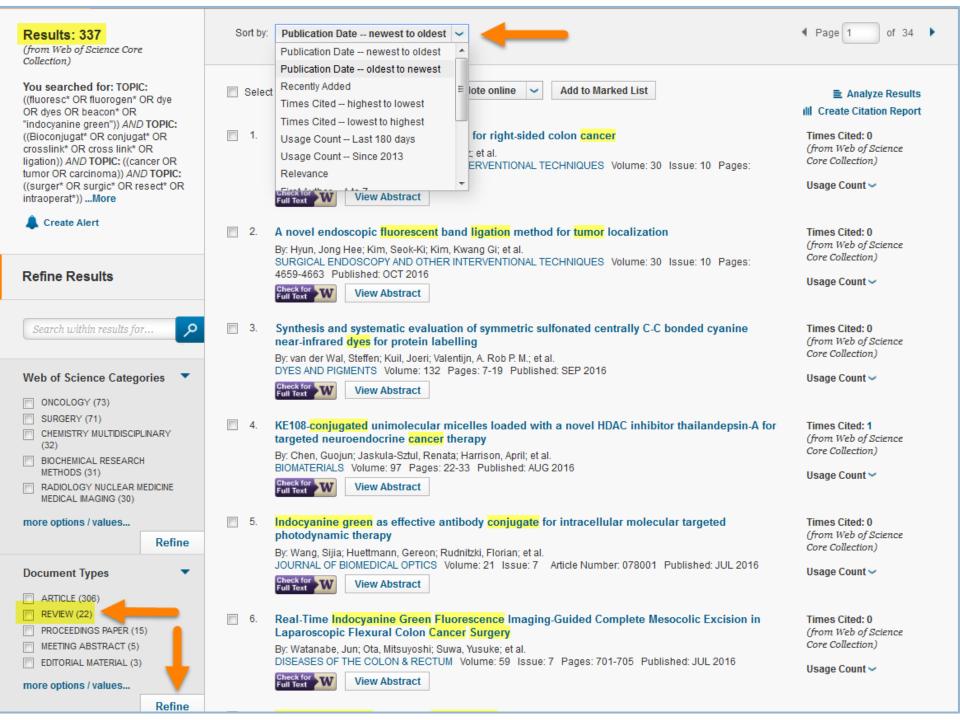
- Animal studies or clinical studies?
- Recent publications or many years back?
- Written in English or written in another language?
- Publication Types (clinical trials, review articles)
- Authors/affiliations

Also consider adding or removing words or concepts.









### Citation Chasing: Web of Science



### Tumor Paint: A Chlorotoxin:Cy5.5 Bioconjugate for Intraoperative Visualization of Cancer Foci

Who has cited this 2007 article?

Mandana Veiseh, <sup>1</sup> Patrik Gabikian, <sup>2</sup> S-Bahram Bahrami, <sup>1</sup> Omid Veiseh, <sup>3</sup> Miqin Zhang, <sup>2,3</sup> Robert C. Hackman, <sup>1,4</sup> Ali C. Ravanpay, <sup>1,8</sup> Mark R. Stroud, <sup>1</sup> Yumiko Kusuma, <sup>1</sup> Stacey J. Hansen, <sup>1</sup> Deborah Kwok, <sup>1</sup> Nina M. Munoz, <sup>1</sup> Raymond W. Sze, <sup>5</sup> William M. Grady, <sup>6,10,11</sup> Norman M. Greenberg, <sup>1</sup> Richard G. Ellenbogen, <sup>2,9</sup> and James M. Olson <sup>1,47,8,9</sup>

'Clinical Research Division, Fred Hutchinson Cancer Research Center; Departments of 'Neurosurgery, 'Material Science, 'Pathology, 'Radiology, 'Medicine, and 'Pediatrics, and 'Program in Neurobiology and Behavior, University of Washington; 'Children's Hospital and Regional Medical Center; and 'Puget Sound Health Care System, Seattle, Washington; and ''Cancer Biology Department, Vanderbilt University Medical School, Nashville, Tennessee

#### Abstract

Toward the goal of developing an optical imaging contrast agent that will enable surgeons to intraoperatively distinguish cancer foci from adjacent normal tissue, we developed a chlorotoxin:Cy5.5 (CTX:Cy5.5) bioconjugate that emits near-IR fluorescent signal. The probe delineates malignant glioma, medulloblastoma, prostate cancer, intestinal cancer, and sarcoma from adjacent non-neoplastic tissue in mouse models. Metastatic cancer foci as small as a few hundred cells were detected in lymph channels. Specific binding to cancer cells is facilitated by matrix metalloproteinase-2 (MMP-2) as evidenced by reduction of CTX:Cy5.5 binding in vitro and in vivo by a pharmacologic blocker of MMP-2 and induction of CTX:Cy5.5 binding in MCF-7 cells following transfection with a plasmid encoding MMP-2. Mouse studies revealed that CTX:Cy5.5 has favorable biodistribution and toxicity profiles. These studies show that CTX:Cy5.5 has the potential to fundamentally improve intraoperative detection and resection of malignancies. [Cancer Res 2007;67(14):6882-8]

#### Introduction

For many types of cancer, the precision of surgical resection directly influences patient prognosis. Unfortunately, intraoperative identification of tumor margins or small foci of cancer cells remains imprecise or depends on surgical judgment. Thus, the extent of surgical resection is constrained by the requirement to avoid harming vital healthy structures. Nowhere is this more problematic than in the brain, where >80% of malignant cancers

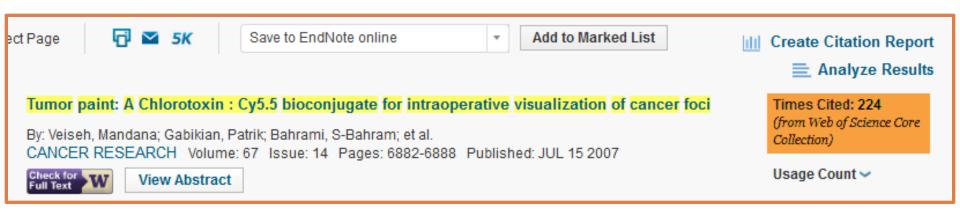
to specifically illuminate tumor cells with targeted molecular beacons.

We developed and conducted preclinical evaluation of a molecular imaging bioconjugate composed of chlorotoxin (CTX) and Cy5.5. CTX is a 36 amino acid peptide with four disulfide bridges. CTX is thought to bind to a lipid raft-anchored complex that contains matrix metalloproteinase-2 (MMP-2), membrane type-I MMP, and transmembrane inhibitor of metalloproteinase-2 (TIMP2), as well as CIC-3 chloride ion channels, and other proteins (2, 3). Upon CTX binding, the complex is postulated to be internalized into the cell, eliminating the functional chloride ion channel (2, 3). Several studies showed that CTX binds preferentially to glioma cells compared with non-neoplastic cells or normal brain (2, 4, 5). A radiopharmaceutical bound to synthetic chlorotoxin, <sup>131</sup>I-TM-601, showed safety in phase I/II clinical trials for human brain cancer therapy based on an acceptable safety profile in preclinical studies (6).

Cy5.5 is a fluorescent molecular beacon that emits photons in the near-IR (NIR) spectrum. Because photons of this wavelength are minimally absorbed by water or hemoglobin, NIR beacons are well suited for intraoperative imaging (7, 8). Previous attempts to image brain tumors by NIR have focused on targeting the probe to inflammatory microglia around the tumor or using probes that require proteolytic cleavage for activation (9, 10). The former approach is challenging because the presence of microglia correlates poorly, if at all, with margins of many brain tumors. Furthermore, to reduce perioperative brain edema, patients are treated with dexamethasone, which is a potent inhibitor of microglial activation. These factors, coupled with preference for a



Articles in Web of Science have a link on the right to the Web of Science articles that have cited it.



### Citation Chasing is a Good Complement to Searching for Words in Titles and Abstracts

 ZNF131 suppresses centrosome fragmentation in glioblastoma stem-like cells through regulation of HAUS5

By: Ding, Yu; Herman, Jacob A.; Toledo, Chad M.; et al.
ONCOTARGET Volume: 8 Issue: 30 Pages: 48545-48562 Published: JUL 25 2017



View Abstract

 RGD/CTX-conjugated multifunctional Eu-Gd2O3 NRs for targeting detection and inhibition of early tumor

By: Wu, Zhi; Huang, Zhongbing; Yin, Guangfu; et al.

JOURNAL OF MATERIALS CHEMISTRY B Volume: 5 Issue: 25 Pages: 4863-4875 Published: JUL 7 2017



View Abstract

3. Fluorescent chemical probes for accurate tumor diagnosis and targeting therapy

By: Gao, Min; Yu, Fabiao; Lv, Changjun; et al.

CHEMICAL SOCIETY REVIEWS Volume: 46 Issue: 8 Pages: 2237-2271 Published: APR 21 2017



View Abstract

4. Fluorescence lifetime-based contrast enhancement of indocyanine green-labeled tumors

By: Kumar, Anand T. N.; Carp, Stefan A.; Yang, Jing; et al.

JOURNAL OF BIOMEDICAL OPTICS Volume: 22 Issue: 4 Article Number: 040501 Published: APR 2017



View Abstract

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  copy free of charge.
- . Customize PubMed to show UW full-text links by modifying settings in your My NCBI account.
- Customize Google Scholar to show UW full-text links by modifying settings in your Google account.

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- Participate in Scholars' Studio and practice giving a 5-minute presentation for your peers.
- · Stay current with Research Commons events.

http://guides.lib.uw.edu/hsl/bioen530