Activity Part 1

- Brainstorm for one minute on your own about the kinds of resources you will need to complete this assignment, and what the requirements for those resources are.

- Pair up with the person sitting next to you. Discuss what you came up with on your own.

- Be ready to share with the rest of the class.
Activity Part 2

• Main Article
  • from an approved popular science news publication
  • about a breakthrough in biology that is related to what you have talked about in class

• Background Information
  • scholarly primary sources
  • scholarly secondary sources
Definitions

• Scholarly
  • written by researchers with academic credentials (advanced degrees)
  • aimed at others in the same field
  • reports on or analyzes original research

• Popular
  • written by people outside the field, like journalists
  • aimed at the general public
  • summarizes research
Background Information

• Scholarly Primary Sources (in the sciences)
  • original research done by the authors
    • description of the experiment
    • data collected
    • analyses and conclusions
  • types:
    • journal articles
    • dissertations
    • technical reports
    • conference papers
**ARTICLE**

**Allosteric ligands for the pharmacologically dark receptors GPR68 and GPR65**

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**Abstract:**

Allosteric ligands that activate G protein-coupled receptors (GPCRs) at low nanomolar concentrations are attracting interest as novel therapeutic agents. However, the development of these ligands has been hindered by the difficulty in identifying small molecules that can selectively activate or inhibit GPCRs without affecting their native ligand-binding properties. Here we report the discovery of a series of small molecules that selectively activate GPR68 and GPR65, two orphan receptors with unknown endogenous ligands. These compounds bind to the extracellular domain of GPR68 and GPR65 and activate the receptors in a concentration-dependent manner, without affecting the binding of their endogenous agonists. The discovery of these compounds provides a new strategy for the development of allosteric modulators of GPCRs and opens up new avenues for the treatment of diseases associated with GPCRs.
Background Information

- Scholarly Secondary Sources
  - describe, interpret, analyze, and/or synthesize primary sources
  - examples:
    - books
    - literature review articles

Information on this slide from: https://library.ithaca.edu/sp/subjects/primary
Scholarly Secondary Sources

Zwolinski et al. (1988) published the results obtained for a TLC-UV-densitometric method in the analysis of LID in seminal, prostatectomy, and prostatic tissues (Table 20.1). The native substances were extracted from pharmaceutical dosage forms with absolute ethanol. The ethanolic extract was applied to the chromatographic plate. LID was separated from other components in the mixture and was subjected to TLC without preliminary extraction. Recoveries of LID from pharmaceutical dosage forms were in the range of 99.26%–100.72%. The RSDs were less than 3% for all formulations.

The same mobile phase was used to develop an HPLC method for the determination of dihydroesteroids in the dosage form (Zovko et al. 1996). The results obtained by the HPLC method and the TLC method for the same dosage form were compared. The linear response was achieved by plotting absorbance against concentration. The RSDs of the peak areas were 1.3% for TLC and 0.7% for HPLC, respectively. For the RSDs of the peak areas in the range of 99.6%–100.1% for HPLC and 99.2%–100.7% for TLC, respectively. The RSDs of the peak areas in the range of 99.6%–100.1% for HPLC and 99.2%–100.7% for TLC.

Chovanec et al. (2006) established a simple, rapid, specific, and sensitive technique for the quantitative determination of LID and phenylpropanolamine hydrochloride (PPA). The separation was performed using a standard assay as a blank and the separation was achieved by developing the chromatographic technique. The chromatographic conditions were found to be 24 and 25°C, respectively.

The detection limits of lidocaine and PPA were found to be 2 and 1 mg, respectively. The method was validated regarding the system precision, method precision, specificity, and the intra- and inter-day variability. The RSD of less than 3% suggested system suitability and precision of the described method.

Your single, selective, and accurate methods were adopted for quantitative determination of lidocaine and PPA in the presence of other active ingredients present in the mixture (Rad et al. 2006). Lidocaine and PPA were determined at 220 and 237 nm over concentration ranges of 1.5–40 and 1.0–30 μg/mL, respectively. The LODs were 0.03% and 0.04% for lidocaine and PPA, respectively.

The RSDs of the peak areas were found to be 1.3% for TLC and 0.7% for HPLC, respectively. The RSDs of the peak areas in the range of 99.6%–100.1% for HPLC and 99.2%–100.7% for TLC.

Slavica et al. (2006) reported TLC chemical analysis of LID and PPA and that the chromatographic conditions were given in Table 20.1. Krtolica et al. (2006) established a simple, rapid, specific, and sensitive technique for the determination of lidocaine and PPA. The separation was performed at 24 and 25°C, respectively. Two systems were run at 200 HPLC (C. & P.) and 25°C, respectively. The RSDs of the peak areas were found to be 1.3% for TLC and 0.7% for HPLC, respectively.

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The detection limits of lidocaine and PPA were found to be 2 and 1 mg, respectively. The method was validated regarding the system precision, method precision, specificity, and the intra- and inter-day variability. The RSD of less than 3% suggested system suitability and precision of the described method.

Your single, selective, and accurate methods were adopted for quantitative determination of lidocaine and PPA in the presence of other active ingredients present in the mixture (Rad et al. 2006). Lidocaine and PPA were determined at 220 and 237 nm over concentration ranges of 1.5–40 and 1.0–30 μg/mL, respectively. The LODs were 0.03% and 0.04% for lidocaine and PPA, respectively.

The RSDs of the peak areas were found to be 1.3% for TLC and 0.7% for HPLC, respectively. The RSDs of the peak areas in the range of 99.6%–100.1% for HPLC and 99.2%–100.7% for TLC.
Main Article

• Popular Secondary Sources
  • describes and summarizes research done by others
  • examples:
    • newspaper articles
    • magazine articles
    • books
    • podcasts
    • blogs
Popular Secondary Sources

Sightings

An Unusual Shimmer

The golden scarab keeps its shine even when other beetles do not. Now we better understand how, but not why, it does so.

To examine the outer shells, or cuticles, of shiny beetles, scientists can view them through filters like those found in modern 3D-vision glasses, which use both left- and right-handed circularly polarized filters (in the diagram below illustrate), one type of filter for each eye. Some shiny beetles reflect left-handed circularly polarized light, so although they still appear shiny through the left-handed filter, the right-handed filter eliminates the shiny color, allowing for close examination. The golden scarab beetle, Cetonia aurata, surprise researchers because it has a structure that allows it to reflect both left- and right-handed circularly polarized light, and not equally the same intensity.

"It is unclear whether any other species of beetle or similar animal consistently reflects left-handed and right-handed circularly polarized light," says Peter Vukusic, who researches on biophysics at the University of Southampton in the United Kingdom. "If someone in a company were to design this, it would be a stunning innovation."

C. aurata can reflect both types because it has a special layer in its cuticle that appears to work as a half-wave plate, transforming left-handed circularly polarized light into the right-handed circularly polarized light. It's particularly interesting because C. aurata has the same structure as the thousand other beetle species known to reflect left-handed circularly polarized light. It just has two such structures, separated by that special layer.

"This complex structure is very rare. Indeed," says Ewan Flickweat, because the insect could inform "a potential role of several optical components." Flickweat is a first author of the paper describing the work that he, Vukusic, and Luke McDill invented published in the June issue of the Journal of the Royal Society Interface.

To examine that complex structure, the team employed the high-resolution imaging techniques of transmission electron microscopy and scanning electron microscopy. Preparing the cuticle sample using the techniques resulted in a bit of shrinkage but did not otherwise affect the material's structure. After analyzing the physical layers, measuring optical reflectance, and then creating computer simulations to model that performance, the team suggested a hypothesis for how light passes through and is reflected by C. aurata's cuticle.

As a result, unpolarized light strikes the top layer, the components of the light that are left-handed (or right-handed) circularly polarized light are reflected by the first such structure, which is formed from layers of aligned chitin nanofibers made of chitin, a protein found in beetle exoskeletons. An image at right Components of the unpolarized light that are right-handed (or right-handed) circularly polarized light is refracted by that upper structure. And because the intensity of reflected circularly polarized light is about the same from the cuticle of C. aurata, that suggests that the optical architecture is not an artifact at all, but is evolutionarily important for some reason still to be discovered—Robert F. Service
Strategies for Finding Background Information

• Track down the scholarly primary article on which the popular article was based

• Find publications by other researchers mentioned in the popular article

• Locate articles and books on the same topic or a broader topic
Finding Popular News Articles

- Use the database *MasterFILE Premier*
  - search for articles within a publication by typing the title of the publication into the search box and then choosing “SO Journal name” from the drop-down menu
  - use the small drop-down menu above the results list to sort the results by “Date Newest”

Click the “Databases” tab on the library homepage

Click on the letter “M” and scroll down to the link for *MasterFILE*
Finding Background Information

- Use the database *Web of Science*
  - Find the original article on which your news article is based by doing an author and keyword search. Type the author’s last name into the search box and select “Author” from the drop-down menu. In a second search box, add keywords related to the topic of the article.

Click the “Databases” tab on the library homepage

Click on the letter “W” and scroll down to the link for *Web of Science*
Finding Background Information

• Use POLAR, the library catalog, to find books
  • You don’t have to read the whole book! Use the index and table of contents to find the chapter or section that is relevant to your topic.

Click on the “Find Books & More” tab on the library homepage
Activity

• On the paper, write the following:
  • The most important thing you learned in this session
  • One remaining question that you have OR one thing in this session that confused you