**Scientific Communication Writing Assignment Rubric – Peer Evaluation**

**Your name:** Olivia

**Assignment reviewed:** Cora Fisher, “Robotic Pill Capsules May Be Used to Deliver Life-Saving Medications”

Drugs utilizing large proteins, such as insulin, can often be difficult to deliver directly to the location needed in the human body – requiring those who need the drugs to take injections. Injections like these are invasive, painful, and inconvenient – and much more difficult to keep up with than simply taking a pill. However, researchers at MIT have recently been developing “RoboCap,” a capsule or pill no larger than a multivitamin that can deliver necessary proteins to the proper places with speed and efficiency. Drugs that are typically orally ingested are taken through the gastrointestinal tract and broken down, usually by stomach acids, and then passed through the liver, into the bloodstream. Some medications take roughly thirty minutes to break down and enter the bloodstream, while others take significantly longer (OCRC). However, medications like insulin need to be directly delivered to places of interest – specifically the bloodstream – before being broken down by the acids in one’s stomach, making it normally impossible to be taken orally through a pill. This is why, much of the time, insulin is administered to those who need it through shots or injections (Mayo Clinic). These pills also have a default time moving through another barrier of absorption: the luminal mucus barrier. A new development at MIT may now be making oral administration of insulin and other proteins an option for those in need in the future – with a capsule called “RoboCap.” This new device has a robotic head, which spins – allowing it to burrow through the mucus layer lining the digestive tract, enter the small intestine, and reach cells in which it can be absorbed to be of use (Science Daily). The primary goal of the pill was to be able to directly deposit its vital contents on the epithelium, or outer layer of tissue, so that it could be most easily absorbed. The RoboCap contains an internal motor which is not activated at first. As the capsule moves through the body, it carries its “drug payload” at one end and the internal motor at another. No larger than a multivitamin, the pill is coated with a gelatinous substance that dissolves at a specific pH, which, when reached, then instructs the capsule to begin its burrowing. The pill’s coating also contains studs that “brush mucus away, similar to the action of a toothbrush” (Science Daily). As the internal motor allows the capsule to spin and push aside mucus, the spinning motion also helps to degrade the outer coating of the pill and deposit necessary drug components in the body. The RoboCap has not yet been applied to human usage, but has been tested in animals with both insulin and vancomycin, which is an antibiotic used to treat a multitude of infections. Researchers found that the capsule did not only deliver antibiotics and insulin effectively, but also more efficiently than an injection would. In fact, delivery of the drug via RoboCap enhanced the availability of the drug to the body by a factor twenty to forty times greater than by injection. The RoboCap capsule made absorption for these drugs, and others more effective both ex vivo and in vivo in animal models – meaning both when the tests were performed outside and inside of the body of animals – specifically swine models (Srinivasan et. al). After the capsule has delivered its contents, the casing was able to pass seamlessly through the intestinal system, with no snagging or complications (Science Daily). The RoboCap product will continue to be developed, and may hit the market eventually, potentially becoming a life changing device for those in need of a variety of medications and drugs.

Works Cited

Diabetes treatment: Using insulin to manage blood sugar. Online, Mayo Clinic. Available: https://www.mayoclinic.org/diseases-conditions/diabetes/in-depth/diabetes-treatment/art20044084. Updated August 7, 2021 [accessed October 21, 2022]. How Does the Body Metabolize Medication? Online, Orlando Clinical Research Center. Available: https://ocrc.net/how-does-the-body-metabolize-medication/. Updated September 26, 2016 [accessed October 21, 2022]. Robotic drug capsule can deliver drugs to gut. Online, Science Daily. Available: https://www.sciencedaily.com/releases/2022/09/220929133354.htm. Updated September 29, 2022 [accessed October 19, 2022] Primary source: https://www.science.org/doi/10.1126/scirobotics.abp9066 (purchased access)

Why I chose this topic:

I have always been very interested in how medication is metabolized by the body. As an individual who has to take multiple medications, I wonder constantly why my body takes in some faster than it does others, and why I have to take some more frequently than others. I also have several friends who are diabetic and have seen them struggle both with the hassle of injecting insulin when needed, but also with the cost of the medication they need to keep themselves alive. If there is more advanced technology that would allow them to stay healthy and safe in an easier and more cost-effective way, I would love to know all about it and understand what still needs to be developed in order for it to be utilized.

**Using the rubric below, please evaluate each of your assigned news articles in each of the areas shown, filling out a separate evaluation form for each news article. Please highlight the part of the rubric text that explains why you chose a specific assessment category. In the “General Feedback” section at the bottom of this form, please include more specific feedback, including things that you liked as well as things that you feel could be improved upon and suggestions on how to improve them.**

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| --- | --- | --- | --- |
|  | **Excellent** | **Good** | **Needs Improvement** |
| **Content:**  **Does the news article convey the writer’s understanding of a biological topic?** | The news article introduces a biological topic and clearly illustrates the writer’s understanding of the topic including what is known and not known about it and how understanding the biology associated with the topic helps us understand larger issues or concepts. | The news article introduces a biological topic and presents information about it, but the topic is not explained clearly or doesn’t distinguish between what is known vs. what is not known or doesn’t explain how understanding the biology associated with the topic helps us understand larger issues or concepts. | The news article does not illustrate the writers understanding of the topic and does not indicate what is known vs. what is not known or how understanding the biology associated with the topic helps us understand larger issues or concepts. |
| **Audience:**  **Is the writing appropriate for the target audience?** | The news article avoids jargon and clearly defines terms and ideas for a non-expert audience. | The news article defines or explains some terms, but some key terms or ideas would be challenging for a non-expert audience. | The news article lacks definitions and explanations, making the topic inaccessible to a non-expert audience. |
| **Organization:**  **Is the news article clearly organized?** | The news article is well organized and easy to follow with good transitions between the paragraphs. | The news article is generally organized and easy to follow but conceptual connections aren’t always clear. | The news article is disorganized, and the information presented doesn’t flow well. |
| **Rubric continues on next page** | | | |
|  | **Excellent** | **Good** | **Needs Improvement** |
| **Format, spelling & grammar:**  **Does the news article follow the recommended format and is it free of writing errors?** | The news article follows guidelines for paper length and format and has been carefully proofread for spelling and grammatical mistakes. | The news article is outside the recommended length or does not conform to the formatting guidelines; the news article contains a small number of spelling and/or grammatical errors. | The news article is significantly outside the recommended length and does not conform to the formatting guidelines; the news article contains numerous spelling and/or grammatical errors. |
| **Citations:**  **Are the citations presented appropriately?** | The news article contains appropriate in-text citations and a list of references for all source material. | The news article is missing either appropriate in-text citations or a list of references. | The news article is missing appropriate in-text citations and a list of references OR citations are missing for one or more sources. |
| **Rationale for choosing topic:**  **Did the writer indicate why they chose the topic?** | The rationale for choosing the topic is clearly explained. |  | No rationale for the topic’s choice is provided. |

**General feedback (5 points):**

Overall, this essay is good, it introduced RoboCaps well, and it is well organized and formatted. It just needs to be clearer in some places, the background information needs to connect with the findings of the research study and the bigger implications of this research study need to be expanded on.

Key points:

* Mention who would need the RoboCap pills, and why might they need it?
* Explain, define terms like vancomycin
* Review whether information mentioned is relevant to this essay
* Be clearer about the findings of the research study, like why is RoboCap more efficient than an injection?
* Use the background information at the beginning to connect it with the findings of this product. Link it together!

**Overall assessment (excellent, good, needs improvement):** Good.