Dear Editor,

Please find enclosed a modified version of my newspaper science column manuscript “One Researcher’s Hope for a Cure: Dr. Lutter Searches for Answers to Cystic Fibrosis”. To address the concerns and comments raised by the 3 reviewers, I made the following changes to improve and clarify the manuscript. It is my hope that these changes make the manuscript acceptable for publication in Microreviews in Cell and Molecular Biology.

Sincerely,

Emma Tims

**Reviewer 1:**

1. Reviewer 1 pointed out that I needed something to grab the audience’s attention in the first paragraph which was very helpful to me and allowed me to improve the quality of my manuscript.

2. I made my intro paragraph more interesting as a result of the comments of Reviewer 1.

**Reviewer 2:**

1. Reviewer 2 did not have any helpful comments.

2. I made no changes to my manuscript as a result of the comments of Reviewer 2 because they made only positive comments about my article.

**Reviewer 3: simplify it for the masses**

1. Reviewer 3 pointed out that I needed to simplify my manuscript so the masses could understand it as ell as the scientific community which was very helpful to me and allowed me to improve the quality of my manuscript.

2. I simplified the content of my manuscript as much as I could as a result of the comments of Reviewer 3.

**One Researcher’s Hope For a Cure:** Dr. Erika Lutter Searches for Answers to Cystic Fibrosis

Cystic Fibrosis (CF) is a rare and deadly genetic disease that many people in our world are unaware of. So what is it exactly? According to the Cystic Fibrosis Foundation, CF is a progressive disease affecting a person’s lungs and their ability to breath. It has shortened millions of lives by clogging patients’ airways with mucous and trapping unwanted bacteria. Professor Erica Lutter at Oklahoma State University sat down for an interview about her current research on this disease. The interview began with Dr. Lutter sharing how she became interested in her field. As an undergraduate, Lutter discovered research and learned that she “loved working with her hands and asking questions.” However, it was not until she got her PhD, that she began work on *Pseudomonas aeruginosa* and CF. Years later, Lutter is a combination of a cell biologist and bacteriologist and is able take her research of CF to the next level by using unique practices from both fields.

In Dr. Lutter’s research that was published in 2016, she and her colleagues found genome sequences of five different strains of the bacteria *P. aeruginosa*. These strains came from sputum samples from CF patients with chronic isolation. These patients are from OU Children’s Hospital in Oklahoma City, whom her labs works closely with. From these five genomes, they found strain-specific differences, protein models important to pathogenesis, and antibiotic resistance genes using the VFDB and ARDB databases (2016). Among the

genes they found, they saw ones for “Beta-lactamase, multidrug resistance efflux pumps, bacitracin resistance protein, and the efflux transporter system OprM” (2016). With this information Dr. Lutter was able to expand her research and focus on the role of Calcium in relation to the CF environment and *P. aeruginosa,* a key bacterial agent in CF.

Lutter’s most recent research involves observing what is happening in context of human cells. She compares epithelial cell lines to CF cell lines and measures their toxicity. She looks at how the cell lines, the microenvironment of the CF lung, and bacteria interact with and enforce the disease of Cystic Fibrosis. The lab’s most recent development proves that calcium does indeed affect how *P. aeruginosa* interacts with line cells both in regular epithelial cells and in terms of CF cells. Dr. Lutter found that not only is *P. aeruginosa* more virulent but it is more capable of attaching and increasing reactive oxygen species directly toward the CF cells. Not just general virulence, but it can actually cause more damage to the patient with CF. Professor Lutter stated that, “the reason we are doing the research, [is] we are really trying to get an idea of what is actually happening inside the CF lung.” That way she can understand the bacteria’s relationship in a polymicrobial environment with a lot of other factors, including calcium, to see if treatments are worse off in the presence of it. Dr. Lutter tries to rebuild this complex environment in a CF lung so, she can gauge whether the current treatment is effective or if they need modification.

Professor Lutter works closely with chemists at OSU, who make new antimicrobials for CF. She states that “it gives us a way to test these antimicrobials for efficacy before we even go further.” So instead of just testing the drugs in a plate and a broth, they can see if it is going to work in the presence of host cells and whether or not it will be toxic to them. Lutter says that the “goal is to gain as much information as we can in order to try and understand how we can modify things in the future.” She admits that it will take some years before her research really makes an impact in terms of treatment, but sometimes you have to get all the basics together before you can actually take it to the next level.

References:

Couger, M.B., Wright, A. Lutter, E.I., Youssef, N. *Draft Genome Sequences of Five Pseudomonas aeruginosa Clinical Strains Isolated from Sputum Samples from Cystic Fibrosis Patients*. Genome Announc. 2016 Jan 28;4(1). pii: e01528-15. doi: 10.1128/genomeA.01528-15.