All about Lucy

Written by Christina Plank
For the Eureka!2016 Writing Competion

Dear loyal friends, fans, followers and patrons,

This is your Lucy writing. My employer, however, calls me Luciferase from *Photinus pyralis*. You know, some humans tend to maintain a barrier between their employees and themselves by addressing them with their complete given name. But you and my friends may call me Lucy. I repeatedly get fan letters asking whether I could share details of my glamorous life. Well, I'm working in a kind of secret service (not directly for the German Chancellor, but okay) which is going to change the world by helping eradicate a severe disease. If you promise to maintain your silence forever (or at least until our stuff has been patented), I'll make an exception THIS TIME. I can't afford to be thrown out of my current job due to giving away highly informative information on our hopefully-someday-going-to-be-patented substance. I've signed a contract to keep quiet until it's been published. Pressure, I tell you! For a firefly luciferase like me it's extremely difficult to find a new position. And despite all the trouble I often have to face, it's a lot of fun – at least for me, not so much for my boss. But anyway, you have to have a high frustration level, if you want to be FAMOUS! So, here's how my daily timeline goes: My day usually starts with taking a hot bath at 42 °C. This naturally is uncomfortable, since me being a protein, I lose my native structure i.e. unfold (the same that happens with the scrambled eggs) and, ergo lose my functional status. In my active state, I'm producing a lot of light. Did you know that exactly this kind of light reaction takes place in fireflies? Oh yes, it's me who's making them glow. Applause, applause, I'm living for the applause, thank you! You might be excited to know why people want to destroy their employees by heating them up and making them lose their functionality? Well, my colleague needs to show that she's still functionally active when there's another substance present which may or may not affect her functionality. My buddy is Piggy. Actually, her full name is heat-shock protein cognate70 isolated from the brain of *Sus scrofa domestica* but due to this ridiculously long name she's simply called by her nickname. Piggy's task is to refold denatured proteins and to maintain their proper three-dimensional structure to protect them from losing their functionality. That's what happens to me when I'm not handled with a lot of care and put on a heat-shock diet. Before starting the most interesting part of the whole experiment, our employer runs a lot of controls, and repeats them several times. In the pre-tests it's checked what happens to the light signal when it's only me without being heat-shocked. Of course, I'll start producing a lot of light so the signal is at its top. The following experiment I really enjoy: My buddy Piggy and me together. We're gossiping a lot while I'm producing light and Piggy's checking her face in the mirror and doing her hair. She's very hoity-toity. In the next step, I've already taken a hot bath. Under these conditions – especially without Piggy – I'm like the dying swan. I can't produce light anymore. Afterwards, Piggy shows up and needs to demonstrate what she's learned in the heat-shock school: Refold denatured proteins like me. I can tell you guys, she's paid a lot of attention and she absolutely deserves the prize "molecule of the century" for her outstanding chaperone work. She helps me in regaining my original structure and therefore I can again produce light. Unfortunately, I'm often too exhausted from the heat-shock and refolding that I'm unable to reach my complete potential i.e. my original light levels. Piggy and I are more or less working hand in hand or how she would say: N terminus in C terminus. Finally, in the most important part of the project it's me (heat-shocked and exhausted), Piggy and a small organic compound that some human beings assume to inhibit Piggy's function. And now the master question for you: What'll happen if this molecule

indeed reduces Piggy's function? Mhhh? I see, you haven't paid attention to my discourse. If you want to be successful in your life as a researcher, you have to have a feeling! The answer is: If Piggy's inhibited by this compound, she can't help me with refolding which means I've lost my light (no, the *Lumos* spell won't work here!). Next question - since you're all smart eager scientists and you finally got the feeling: Which experiment is missing? Bingo, me and the substance. There's no use in screaming "Eureka" along the corridor and running around waving flags and singing "I found an inhibitory substance for Piggy" as long as it hasn't been shown that, I, Luciferase from *Photinus pyralis*, am not affected by the vile schemes of inhibition that this molecule has on Piggy. Let's assume everything's worked out the way we wanted it to be: The compound inhibits Piggy, but not Lucy, what does that mean for the world outside the lab? This is probably the most important question ("Why that?") that journalists without borders as well as people might ask when the Nobel Prize is handed over. Well, it's been shown that Piggy plays a crucial role in the development of multiple myeloma, a type of blood cancer. If it works out to inhibit Piggy, multiple myeloma cells die and the cancer's stopped. That's why my employer focuses on finding alternative therapies for the cure of this disease. Fancy, don't you think? Alright, my time is over, I need to go on glowing and jump into the hot swimming pool. See you soon either in the lab or on TV, when the Queen of Sweden hands me the Ig Nobel Prize for acting as the best

Little Ray of Sunshine from Hell.
Yours truly,
Lucy
The Wicked Witch of the Western Wing
House of Photinus pyralis
Neverland