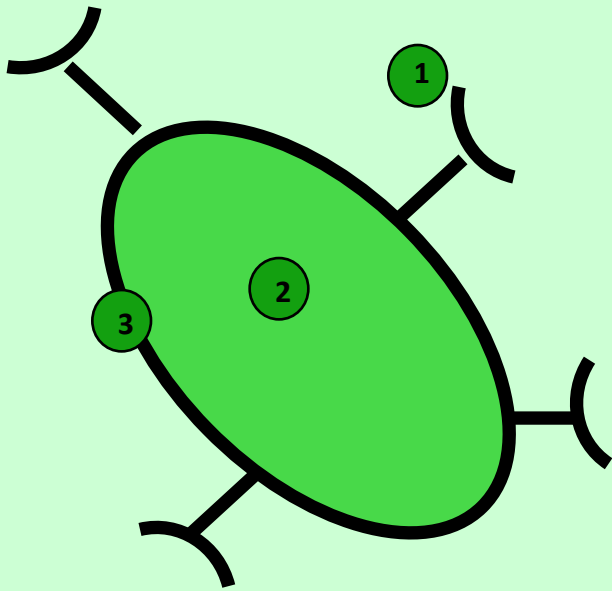
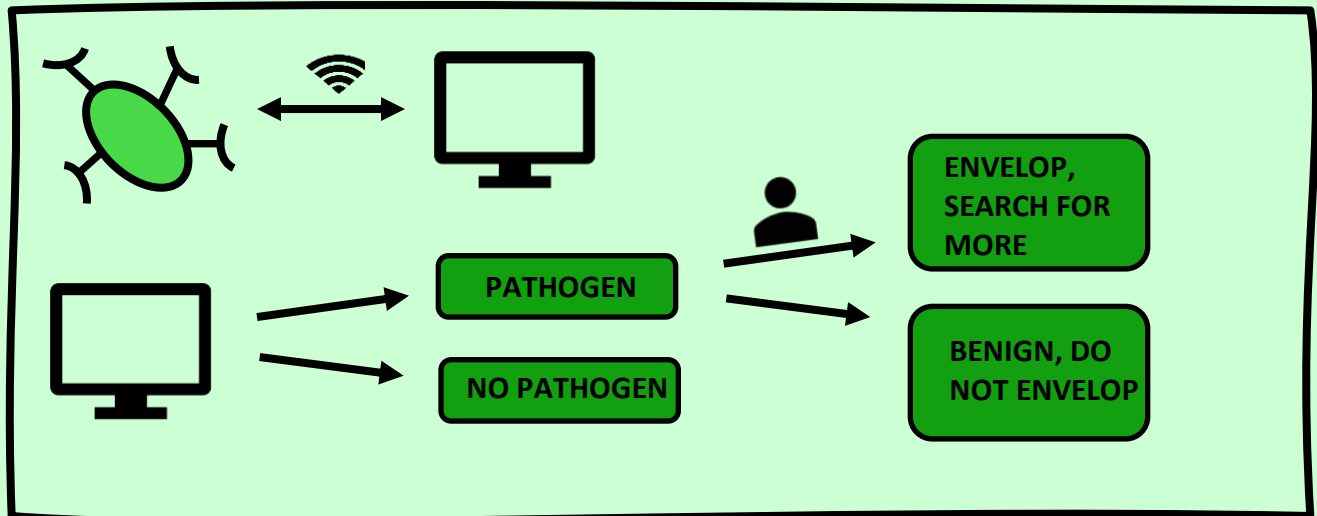


BioDefense



Biodefense is a pill that is made not of drugs, but instead, hardware. Its program is introduced to pathogens and trained to recognize pathogens that resemble these. It is swallowed and can travel through the human body through blood. Connected to a computer software using Bluetooth, it can communicate with the external computer in order to analyze putative pathogens that it finds once ingested. Utilizing a “human-in-the-loop” design, BioDefense transmits information about the pathogen to the user through the computer system. The user can then make a decision whether to envelop this pathogen and seek out identical pathogens to envelop them as well.



- 1 Receptor:** detects pathogens in the blood. Has several sites that can recognize and analyze chemical composition of pathogen, comparing it to known pathogens
- 2 Body:** receives information from the receptors, transmits the information to the connected computer via Bluetooth
- 3 Coat:** indigestible coat prevents the BioDefense from being metabolized in the blood, allowing it to be easily passed by the user



WHY? Viral and bacterial infections are among the top causes of mortality worldwide. These pathogens are specifically an issue in impoverished communities, which often lack the resources necessary for reliable and accurate medical diagnoses. Even if patients in these places have access to doctors, it is difficult and outrageously expensive to acquire non-generic drugs. The biomedical technology required to diagnose uncommon diseases is often only available in major, well-funded hospitals. The BioDefense pill would allow diagnosis and treatment for pathogenic diseases using only the pill itself and the computer software to which it connects.



WHO? While this technology would theoretically serve anyone with a viral or bacterial infection, it is specifically designed to serve communities that lack consistent or affordable access to healthcare. The scope of illnesses it can treat is limited by the capabilities of the receptors, which could only realistically detect pathogens (rather than cancer, autoimmune disorders, etc.) So, this technology is aimed at helping people who have treatable infections but lack access to affordable health care.



HOW? The mechanism of BioDefense is summarized above. The receptors that cover the surface of the pill are trained to recognize a vast range of pathogens, including both viruses and bacteria. Because the proteins embedded in the cell walls and membranes of bacteria are unique, they serve as a biological barcode which can be used to mark and analyze bacteria of the same strain. Viruses, on the other hand, have a unique form and are enclosed in a protein coat. The receptors on BioDefense are trained to recognize both the membrane proteins that are unique to malicious bacteria and the composition and structure of a viral protein shell. They send information collected about any possible pathogen into the body of the pill, which then transmits this information wirelessly to the external computer. The pill's indigestible coat allows it to travel swiftly through the body and to be passed easily in the feces.



ECONOMICS: While the intent behind the design of BioDefense is not to make a profit, this will inevitably happen if the technology proves to be of help in global health crises. However, it would be priced as affordably as possible, considering the basis of its creation lies in the value of helping those who don't have access to good healthcare.



WAY OF LIFE: BioDefense helps us move towards equity in terms of medical care. So, it would affect way of life on an individual basis, i.e. the lives of its patients, as well as their friends and family. On a broader scale, it would affect the way of life of the world at large by beginning to bridge the gap in resources between impoverished and wealthy communities.