Phd proposal

You are applying for sponsorship to undertake a Ph. D. in biomedical science. The Ph. D. training will be split equally between two laboratories, one in the UK and a second at the National Institutes of Health, Bethesda USA. You need to complete the following application form, using UK and USA supervisors who are currently in post (assume that an active web site for an individual is evidence that they are in post).

A word or character limit applies to many sections. Please insert the number of words or characters (as appropriate) in each section.

Q1

Applicant

Surname

ALQuthami

Forenames

Khalid

Student Number

200163543

Supervisor (UK)

Supervisor (NIH)

Surname

Forenames

Title (Dr etc.)

Address

Q2

Title of proposed project: (no more than 220 characters)

Pathogenic bacteria in humans may protect against HIV

(a)

Please provide details of current and previous research experience, e. g. vacation scholarship, undergraduate project (no more than 300 words).

I have an undergraduate degree in medical microbiology. For eight years, I worked as a medical laboratory technician. Currently, I am studying for my Master of Science degree in Biosciences at Leeds University. My major field is in infection and immunity for which I have received training covering a wide range of practical molecular and cellular laboratory skills that have broad relevance to research in the biosciences. Furthermore, I have solid training and personal development experience in genetics that enhanced my transferable skills and attitude.

(b)

Outline the reasons why you wish to study for a PhD and the career you intend to pursue (no more than 500 words).

The search for knowledge is unending. This is the reason why I would like to pursue a PhD in Biomedical Science. My interest in biomedical science and its potential application to contribute knowledge to finding a cure for HIV has played a key role in my pursuit of advanced study. I have been a passionate student and professional medical worker for the past twenty years of my life.

Specifically, the challenge of understanding and finding a cure for HIV has been an enduring part of my career such that I am very keen to study this subject in more depth. Since HIV/AIDS affects more than 30 million people worldwide, the impact of a better, more available, and cheaper cure will definitely send ripples of positivism across the globe. I think that utilizing natural microflora and bacteria to fight the AIDS virus is a novel idea that is worth dedicated research effort. By proving this hypothesis to be right, microbiological agents to fight the AIDS virus can be discovered and designed. The success of this approach can save millions of AIDS patients around the world.

Moreover, the knowledge and training that I will gain as an outcome of this endeavour will be advantageous for the institution that I currently work for as microbiology laboratory technician. Presently, no one else is working on this type of project. The skills and the networks that I will build will enhance the capacity of my institution in this aspect of research. Furthermore, as a PhD degree holder, I will be able to lead research studies that will allow me to build up on the very areas that I am interested in studying. This will contribute to the current body of knowledge and contribute to providing a cure to a global problem, aside from enhancing my own career accomplishments and life achievement.

Q2

RESEARCH INTERESTS

(a)

What is your research question? (no more than 100 words)

My research question is on how pathogenic bacteria in humans can be utilized to protect against HIV. The use of human pathogens to fight HIV (a

virus) entry, proliferation and infection is a novel approach to a lingering world problem. The approach provides an alternative to the use of antibodies to immunize against HIV infection where HIV person-to-person transmission can be greatly reduced (Phogat, Wyatt and Hedestam).

(b)

Why do you think this area of research is interesting? (no more than 250 words)

I would like to quote Lin Tao, a researcher at the College of Dentistry at the University of Illinois (Chicago, IL, USA) who said, “ I believe every life form has its natural enemy, and HIV should not be the exception". Dr. Lin Tao is an Associate Professor of the Department of Oral Biology, College of Dentistry, University of Illinois at Chicago. He further states that " if we can find its natural enemy, we can control the spread of HIV naturally and cost-effectively, just as we use cats to control mice”.

Controlling HIV transmission, its development to full-blown infection and the resulting AIDS has been the subject of many researchers since HIV was first identified to be causing AIDS. Many antiviral therapies have focused on being able to reduce the entry of HIV into host cells where it can remain dormant only to surface many years later when the HIV infection has led to AIDS. There are anti-HIV vaccines bit their effectiveness is lessened by the HIV’s capacity to mutate therefore the recognition sites are no longer valid. Another promising area is using microbiological agents that can recognize the virus and ultimately immobilize it. A review of the current literature shows that there are no studies on this specific aspect. This is a researchable area of major significance.

(c)

How do you propose to address this research question? (no more than 750 words)

To address the research question, a series of laboratory experiments are necessary. However, to save time and cost, before the start of experiments, a thorough review of the current literature needs to be conducted. The literature review must be comprehensive, and will cover all work published in reputable journals and books. Since, this is a new approach, it is possible that no scientific paper has been published on the topic. Nevertheless, it is possible that a similar approach has been conducted in other viruses. Therefore, all this has to be collected, written and evaluated. All aspects of the study have to be included in the literature review. After this, the plan for activities has to be written down and the basic steps are followed.

Among the first things, we have to know characterize or know what the HIV virus is made up. This is necessary to select the bacteria that will prefer the HIV coat. This is coated with the sugar mannose, so we need to screen and find bacteria that prefer and grow well on the unusual sugar mannose. Once colonies are grown, it may also become necessary to establish colonies in some plates for future reference. Secondly, we need to search and isolate pathogenic bacteria that have the ability to bind to bakers yeast and another microorganism coated with mannose-rich sugars. This is necessary to be able to study the interactions outside of the victim’s body. This is to reduce the risk of contamination. Once the ability of the bacteria to recognize and inactivate HIV can be further improved by producing bacteria mutants. The bacteria have to have no affinity for the body’s organs. Finally, the pathogenic bacteria must be responsive to antibiotics so that it can be killed and removed from the system after the job has been done. However, it

might also be possible to select for or find mutants that are non-human pathogenic bacteria specific to killing HIV.

(d)

What scientific considerations led you to choose the laboratory/laboratories and supervisor(s) for your research project? (no more than 150 words)

Both laboratories have been doing research on HIV and other similar viruses. They have the facilities and equipment to do the proposed research. The respective supervisors are interested in my subject and have been doing research in areas that are relevant in the conduct of my study. Both Supervisors are interested in my subject and have done relevant researches in the area of interest. The National Institutes of Health have also been at the forefront of HIV/AIDS research for many years. Furthermore, the NIH, being a government body that also finds research, can provide funding for the proposed research. Both laboratories are open to collaboration.

Work Cited

Phogat, S., R. T. Wyatt and J. B. Karlsson Hedestam. " Inhibition of HIV-1 Entry by Antibodies: Potential Viral and Cellular Targets." Journal of Internal Medicine 262. 1 (2007): 26-43.