Participation and Activity Report

2022 Biomedical Innovation and Entrepreneurship Training Course for SPARK Asia and Oceania

Nailil Husna (PhD Program in Humanics, University of Tsukuba)

Overview

SPARK Asia and Oceania organized the yearly training course on innovation and entrepreneurship in the field of biomedical development. The 2022 training was held Online from 4th to 15th July using Zoom and Teams online meeting application. The training aims to provide education platform to simulate the experience of bringing scientific discoveries, specifically in biomedical sciences, from bench to bedside and market. To provide semi-real condition, the participant was coming from a variety of background including academia (student, researcher and professor), health professional (medical doctor, specialized doctor, medical technician, and hospital administrator), and others (engineer, programmer and product designer). Moreover, the participant also come from different countries such as Taiwan, Japan, and Australia. This diverse professional and cultural background indeed cause challenges and adaptation, but at the same, provide exciting learning condition and enhance creative thinking and problem-solving. The course consisted of lectures, workshops, and exercises.

Lectures

The lectures were given for 1-2 hours with short break. There are six lectures in the first week. First lecture was about creative and design thinking given by SPARK organizers, Dr. Isabella Hajduk and Prof. Michelle Wallach. They deliver the lecture as fun and excellent activity for coming up with ideas for solutions to selected problems and improvements using design thinking tools, and for Coming up with and running a novel, commercially successful project; what it means to be creative, innovative and entrepreneurial. Next lecture was given by Simon Weisman from Wrays about intellectual property as ways to protect the new invention. This lecture was followed by discussion on what truly a valuable innovation. Next lecture was given by Prof. Michael Wallach about going from the bench to the marketplace. Prof. Michael deliver the lecture as open discussion simulating the chronological steps on bringing discoveries to the market, including proof of concept, milestones, clinical trials, business model, funding and investment. Next lecture was given by Lisa Kang about clinical studies focusing on the process and requirement for entering clinical trials, during and beyond. This lecture was followed by another lecture by Prof. Kevin Grimes about repurposing drugs for rapid development, regulatory approval and usage in patients. The requirement and consideration for FDA approval was also discussion. The last lecture is medical device development and technology readiness levels (TRL) presented by Prof. Laurence Meagher. Second week consisted of four lectures. Prof. Jane Tseng presented an entrepreneurial Journey from SPARK Taiwan. Dr. Michel Chu gave lecture on pitching ideas including tips and examples. Last lecture was given by Prof Daria Mochly-Rosen and Dr Fumi Ikeno from KAI Pharmaceuticals. Prof. Daria shares her experience on establishment of her start-up biotechnology companies, including her career change from academia to business side. Dr Fumi present how to finance the idea starting from the finance, funding and business planning.

Workshop and exercise

In the workshop, the participant will be divided into groups of 4 composed of a mixture from the different participating countries and professional backgrounds to complete the task and range of exercises. The task is to develop a new product and provide detailed plan in doing so, starting from the bench to the market side. The exercise included proof-of-concept report, IP strategy and protection plan, 5-minute idea pitch, and final business innovation pitch. Upon completing every exercise, each group will receive feedback, comment and suggestion from the mentors to improve the idea development. The first week workshop was focused to 1) find real-world problem then brainstorm solutions, with novelty and IP in mind, 2) develop the problem-solution into product through a creative and design thinking approach, and 3) define and develop the proof-of-concept and milestone, as well as the success/failure criteria and go/no-go point. The second week workshop was focused to finalise IP strategy, outline business model, and prepare for the 5-minute and final pitch.

Group project

I was assigned to group 7. My group (Nanovatrix) has a radiologist and a biomedical engineer from Taiwan and two biomedical scientists from Japan. We decided to propose an alternative treatment for ischemic cancer. Current treatment for ischemic stroke includes surgery (mechanical thrombectomy) and medication (tissue plasminogen activity, tPA). Unfortunately, these treatments possess challenge such as unable to remove blood clots in small arteries, complication from catheter into brains namely haemorrhage and arterial injury, unable to remove multiple blood cloots simultaneously, and failed surgery. To address these unmet medical needs, we introduce our product named Gingkothronox^{TM}, a drug of gold nanoparticle core with fibrin and platelet peptide extension and gingko metabolites (ginkgolide and bilobalide attached through imine bond) on the surface. This drug is designed to be injected intra-arterially using diagnostic catheter upon the onset. The peptide extension will recognize blood clot location, even in the small arteries. Then, the pH-sensitive imine bond will recognize the slightly low pH level of blood clot to release the gingko metabolite. These metabolites have been scientifically proven to have thrombolytic activity to dissolve blood clot and neuroprotective property to improve brain cell infarction. Our idea is original and we did not find similar patents. We estimated that the project will take about 15 years to complete. We planned to carried out the project until the clinical trial phase II, then we exit; sell the product to established pharmaceutical company with royalty scheme.

Lesson learned

From the SPARK training, I gained knowledge of the essential components for developing innovative products. First, we have to fully understand the problem and unmet medical need. Understanding what end-users really want is equally crucial. Second is being realistic when defining the practical goal. Careful consideration of optimal proof of concept is key to succeed in development. Last, diverse yet solid team is precious. Finding harmony in interdisciplinary collaboration is challenging but once achieved the outcome is extraordinary.

This two-weeks training was quite intense but totally rewarding. We need to actively engage in every lecture and workshop and even stay up till late to finish the exercise and presentation. Though conducted online, we could learn from great mentors, work closely with group members, and expand connection with other participants. I am grateful for the opportunity to participate in this program, and I appreciate mentors, members, SPARK Global and T-CReDO.