End of AY 2017 Report for SIP – Group 8

Project Title

Paradigm shift of cancer therapy

Team

GSDM ID	Name	School	Department	Year (e.g. D1)	Leader/ member
14106	Yuri Yoshihara	Engineering	Nuclear Engineering and Management	D2	Leader
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17108	Guanxiong Wang	Frontier Science	Computational Biology and Medical Sciences	M2	Leader
14105	Seina Ohe	Frontier Science	Computational Biology and Medical Sciences	D3	Member
15116	Miarisoa Razafindrabe	Agricultural & Life Sciences	Global Agricultural Science	D1	Member
17214	Libo Wu	Engineering	Precision Engineering	D1	Member
17203	Dongig Oh	Engineering	Mechanical Engineering	D1	Member
17213	Xiaoxiao Liu	Frontier Science	Computational Biology and Medical Sciences	M2	Member

Objective: Explain what social/global issues that this project tried to address and why the issue is important.

This project was launched last April, in order to think about new future brought by emerging technology in medicine. In this year, this project is a pre-stage project for determining what kinds of approaches we should address to have better future.

One of the most important social issue in medical field (we call them unmet medical needs) that we thought to be satisfied is, that current cancer therapy have to kill normal cell as well as cancer cells, because it would lose people's health. And Immunotherapy has been turned out to be a technical solution to solve the social issue by removing the blocks for immune system and let them work to kill only cancer cells. However, there seems a huge gap between the current therapy and the better therapy.

The objective of this project we focused on is to draw some possible futures as scenarios, which would help us to understand what kinds of approaches we should take to have better future.

Method: Explain through what kind of approaches you tried to achieve the objective.

Presumptions (Limitations) of this scenario planning work

In general scenario-planning process, we need to gather experts in multi fields and make an expert group to discuss issues of each field correctly. As thinking the topic focused on in our project, in order to make the most reliable scenarios, we think the expert group should consist of some experts and medical doctors working on revision of clinical practice guidelines, researchers, and politicians who are making policies for drug price or studying the cutting edge of cancer immunotherapy, and work on revision of clinical practice guidelines, under consideration of COI (Conflict of Interest), and an artist of scenario planning organize the scenario planning process. However, in order to complete this scenario planning with the minimum resources we have, we behaved experts in each field, and listed-up/ranked issues related to future of cancer therapy, and think some scenarios. Besides, in order to make the scenarios we made more reliable, we obtained some experts opinions by some interview.

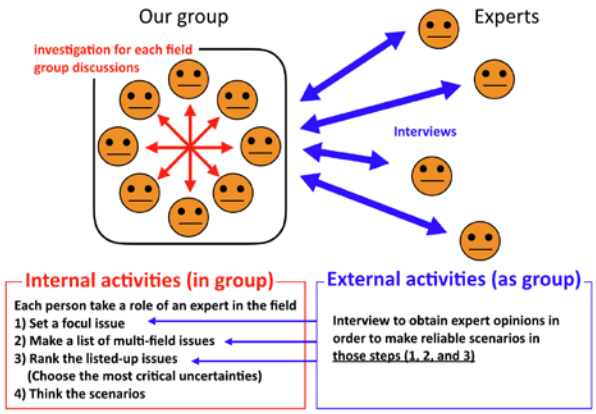

Figure 1: Internal/External project activity for scenario planning

Approach overview

First of all, we conducted several interviews with experts from medical field to set the goal of SIP project and concrete our ideas. It helped us to understand current issues of cancer cell therapy and gave us hint to how to approach to find our target. After interviews, we organized scenario planning, a structured way for organizations to think about the future, to focus on urgent issues in cancer cell therapy field. To be specific, we categorized all the issues using two axis; certainty and criticality. Further interview with expert of scenario planning and energy policy are planned to verify our current works and ask some advices.

Outcome: Explain what kind of results you obtained from this project and discuss how it addressed your focal social/global issues.

Though several interviews we conducted in this project, we could clarify our scenarios by determining the acceleration of clinical practice guideline and clinical infrastructure for early detection were the most critical and uncertain. However, through additional interviews after final report, we also realized there are some faults in this scenario planning process.

1) We missed a viewpoint to think about the issues. If the viewpoint was set, the issues would different. We should be able to find different scenarios.

2) We skipped to get a consensus to explain the current situation with the audience. We could think about issues of immunotherapy from patients' viewpoint, and we should have obtained their opinions by opening workshop or interviewing at the first stage of scenario planning.

Because of some missing steps in our scenario planning process, the scenario we made was slightly far from perfect one, and we haven't discussed well what kinds of concrete approaches necessary to lead better future, we could achieve to think the future of immunotherapy by scenario planning in this project.

Budget: List the budget this project implemented. (See more details in **Appendix-2**.)

Purposes	**Expense**
Total	0 yen

[Appendix-1] Details of Interviews

#Interview-1: Prof.Lee

Prof. Jung Su Lee (The University of Tokyo, Public Health)	
DATE: July 10 2017	PLACE: Medical Faculty Bldg-3 Annex, Hongo

Purpose for this interview:
Because of the lackness of our fundamental knowledge about cancer therapy, we interviewed Prof.Lee In order to understand what are important keywords and knowledge we have to know at the beginning of starting this project.

Interview summary:
We have to understand what is the standard therapy in the country. Every treatment has side effect, and works for some patients, but not for others. Besides, she suggested us that some political issues affect the cancer therapy, such as health insurance. In the newly developed therapy for some cancer, it can be always controversial issue. For example, there is a discussion of trade-offs including, 'clinical trial vs standard therapy', and 'effectiveness and safety'. Generally, It takes long time for newly developed therapy to be standard therapy because the necessity of enough amount of evidence that prove the treatment is the most suitable than other treatments. Doctor basically suggested some options of treatment to patients according to clinical practice guideline. Evidence-based medicine can be a keyword to think what kinds of treatment can be chosen by doctors and patients.

Conclusion:
We learned through talking with Prof.Lee about that doctor and patients determine therapy according to clinical practice guideline, and it generally takes much time for that new medical treatment will be standard therapy because necessity of enough amount of clinical evidence to judge it is the most suitable treatment than other treatments.

#Interview-2: Prof.Kano

Prof. Shingo Kano (The University of Tokyo, Bio-innovation Policy)	
DATE: July 2st, 2017	PLACE: Shirogane 2nd Building, Shirogane-dai

Purpose for this interview:
In order to discuss about immunotherapy and methodology to think about future, we interviewed Prof.Kano in order to understand what we should do for scenario planning.

Interview summary:
Before the meeting, he suggested us some of books and websites about immunotherapy. We talked about what is immunotherapy and why people say immunotherapy bring new paradigm in cancer therapy from viewpoint of a scientist. Scenario is a story of future estimated to happen in future under some assumptions. If we just focus on the things that seem to happen probably, we can just see a kind of usual future that will happen with probably with the no change. In order to bring better future, we have to think about the most critical and the most uncertain things, and what kinds of approaches are necessary for make the better future happen.

Conclusion:
We could make sure that immunotherapy has changed cancer therapy, and scenario planning can be used for us to think about future brought by immunotherapy, which would indicated us what kinds of approaches are effective to bring better future.

#3 Interview-3: Prof.Kato

Prof.Naoya Kato (Chiba University, Gastroenterology)	
DATE: November 2nd, 2017	PLACE: Chiba Univ. School of Medicine Entrance, Chiba

Purpose for this interview:
The motivation of this visit to Prof.Kato was to discuss with Prof.Kato the effectiveness of interviewing patients in hospital of Chiba University and to consult him about what kinds of approaches are more suitable for our project.

Interview summary:
We discussed the necessity for focusing on specific topics or aspects for cancer therapy, and how to find good topics we can address. One of the most effective ways he suggested us was to focusing on a keyword “unmet medical needs”, which is not solved but demanded in science, society, and patients. He said we could investigate unmet medical needs by ourselves through interviews to experts. Besides, he talked about his opinions for cancer therapy from the viewpoint of a scientist and hospital doctor. Here is the talk of his interested points.

- New cancer-therapy technologies ... molecular targeted medicine, especially in immunotherapy
- Social issues: Increase of developing cost of drug & insurance fee
- Interesting points from viewpoint of scientist: Bio-marker, precision medicine, AI, terminal care
- Usefulness of early-detection of cancer therapy -- Lead-time bias
- Therapy options: drug resistance, combination of drug
- Who makes “clinical practical guideline”? -- WHO, societies, Hospitals..
- Which treatment has priority than others? Response rate (SD, PR, CR, PD)

Conclusion:
We could obtain valuable hints to find the issues we should address though this interview. Especially we could recognize a good keyword of “unmet medical needs” as things we want to make sure though our project.

#4 Interview-4: Prof.Kakuwa

Prof. Masahiro Kakuwa (The University of Tokyo, Graduate School of Public Policy)	
DATE: February 27th, 2018	PLACE: International Academic Research Bldg., Hongo

Purpose for this interview:
Through receiving feedbacks about our presentation in the SIP final report on Feb.7th, we realized the necessity of more effort for explaining our project. The method we took to achieve this project goal, "scenario planning", is one of the powerful techniques for helping policy examination. To improve this explanation, we conducted an additional interview to an expert of scenario planning and energy policy, Prof. Kakuwa.

Interview summary:
He said there are many different approaches and models for scenario planning, depending on 'who want to achieve what' by scenario planning. He proposed to us one of the approaches for scenario planning, which is suitable for such an open topic, and an educational activity like student group work as following:
1) Firstly, in order to explain the scenarios we made, we should be able to get consensus with most of all audiences about the balance of issues for immunotherapy in the current situation. In our case, we can set a viewpoint of general people (because half of people would die of cancer) and get opinions from general people by opening a workshop about what/how they think about immunotherapy as a first step.
2) Secondly, we can think what is the most significant issue that should be changed into leading better story for the person. And clarify the path to get the better scenario if you change the most significant issue.
3) Thirdly, to think what kinds of drivers necessary to change the significant issue? You might be able to find some drivers and can make a map for the drivers according to certainty and criticality. Then you can find the most uncertain and critical issues in the map, and make scenarios.
He gave some encouraging comments to us as like 'The process of our scenario planning is not matured, but this challenge is interesting. If we will continue this project next academic year, he can help us. Also he suggested us the possibility to collaborate with STGI to work with scenario planning.

Conclusion:
We could learn the better approach for us to address scenario planning, and it would be better for not only to audience who listen to our explanation, but also better for us in terms of working as SIP, we can interact with many people and experts in actual stakeholders. We couldn't do very well as group work in this year, but hope we could work better in next academic year, and hopefully introducing our working to society and have a open discussion in future.

#5 Interview-5: Prof.Kamae

Prof. Isao Kamae (The University of Tokyo, Health Technology Assessment and Public Policy)	
DATE: February 28th, 2018	PLACE: International Academic Research Bldg., Hongo

Purpose for this interview:
In order to ask expert's opinions about how to determine new medical technology such as immunotherapy, we interviewed to Prof.Kamae, who is an expert of Health Technology Assessment (HTA).

Interview summary:
He suggested us firstly to clarify the viewpoint if we talk about any issues. Especially about medicine, if you

set viewpoints of different persons, you might see things differently. Secondary, the cutting edge of the issue is also important. It would be much better to focus on the specific cutting edge of a specific case as a first stage of the project. You can discuss deeper things from the specific cutting edge of the issue, but not from the general cutting edge of the vague issue.
Also he talked about different viewpoints in medical field. Not only general difference between patients, doctors, but also suggested us about different viewpoints between hospital doctors and practitioners, attending doctors and professional doctors, general doctors and hospital directors, etc.
Also he suggested us if we think immunotherapy from the viewpoint of patients, decision making for treatment is also in our field of view. In the current situation, the decision-making for treatment is happened between patient and government. There are information that help patients with understanding which therapy is suitable for themselves. Patients can decline doctors' suggestions, and choose other options, but your options are limited by if the treatment is insured, etc. About the future of drug for immunotherapy, we talked about the case of the cost 'Opdibo'. He talked there is no person who knows how it will be in future and how it should be from the viewpoint of a scientist, but indicated the possibility of decrease of the drug cost in future under the current law. The cost of drug should be determined through reasonable processes, and if the procedures are correct, we should be able to get a consensus for it if no one knows how much the drug should be.

Conclusion:
We could obtain good advice from Prof.Kamae not only about how we should approach the issues in general, but also some suggestions about the drug cost for emerging drugs. Through discussion with him, we could learn the big background that has been driving the decrease of price of Obdibo.

#6 Interview-6: Prof.Sugano

Prof. Sumio Sugano (The University of Tokyo, Medical Genome Science)	
DATE: March 20th 2018	PLACE: Ito International Research Center, Hongo

Purpose for this interview:
In a public relation brochure "創成" published by , he talked about three breakthrough technologies including immunotherapy, and he said they would bring different cancer therapy in near future. In order to ask about his article and discuss what kinds of technological & social package is necessary for the future, we will interview Prof.Sugano in March. (after submission of this final report).

Interview summary:
Not yet

Conclusion:
Not yet

[Appendix-2] Budget Implementation

1) Initial budget planned in May

Purposes & Justification	Estimated expense (yen)
Interview/fieldwork (Only transportation fee) (The interview place is supposed to be Kanto Area) - The number of interview (planned): 4-5 times - The number of interviewers / interview: 2 persons - The maximum transportation fee / interviewer: 1,000 yen	8,000 - 10,000 1,000 x 2 for 4 - 5 interviews => 8,000 - 10,000
Seminar/IEL organization (Support of transportation fee to invited speakers) (The interview place is supposed to be Kanto Area) - The number of invited speakers: 2-3 - The maximum transportation fee / interviewer: 1,000 yen	2,000 - 3,000 1,000 x 2 - 3 speakers => 2,000 - 3,000
Total	10,000 - 13,000

2) Changed budget plan submitted in November

(a) Purposes & items		(b) Approved	(c) Already spent	(d) Will be spent	(e) =(b)-(c)-(d)
[1]Approved	Meet & talk with external experts (2 persons/interview)	10,000	0	19,746	-9,746
	IEL organization (invite 2-3 speakers) Support of transportation fee to speakers	3,000	0	0	+3,000
Total					-6,746

(b) Approved: the budget SIP committee approved for your group
(c) Already spent: the budget your group has already spent
(d) Will be spent: the budget your group plans to spend in AY2016 (but not spent yet)
(e) if it is negative, it means that you need additional budget.

Justification for additional budget (if the total of (e) is negative)

Reasons for necessity of additional budget

When we started this SIP, we were planning to go to interview to the hospital doctors in ISMUT hospital (東京大学医科学研究所付属病院), but a hospital doctor, whom we could successfully contact in October, has just moved to Chiba University in April 2017. Therefore, some additional budget is necessary for transportation fee from Hongo campus to Chiba University. Though we can compensate some of the additional budget for interview, from the budget for organizing an IEL, we still need 6,746 yen as an additional budget.

Details:

i) Transportation fee (one way): 1,097 yen

- Train: Todai-mae →Iidabashi → JR Chiba : 877 yen
- Bus: JR Chiba → Chiba Univ.,School of Medicine Entrance: 220 yen

ii) Interview schedule:

➢ First interview (pre-interview to Dr. Kato):
1,097 yen x 2 (round) x 3 (persons) = 6,582 yen

➢ Second interview (to patients (アンケート配布) & hospital doctors):
1,097 yen x 2 (round) x 3 (persons) = 6,582 yen

➢ Third interview (to patients (アンケート回収) & hospital doctors):
1,097 yen x 2 (round) x 3 (persons) = 6,582 yen

Total: 6,582 + 6,582 + 6,582 = 19,746 yen → **(e)**: 13,000 – 19,746 = - 6,746 yen

3) Final implementation by end of February

The left Budget: 19,746 - 0 = 19,746 yen

Excuse of change of budget implementation

Because of the difficulty for the most of leaders & members to go to interview, we changed the schedule to go to interview to another experts instead of patients in the hospitals. Besides, some additional interviews were conducted mainly in Hongo campus, and thus, it didn't need any budget except for the interview to Dr.Kato on November 2nd.