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Date（日付）24/11/2020
（Date/Month/Year：日/月/年）

Activity Report -Science Dialogue Program-
（サイエンス・ダイアログ事業　実施報告書）

- Fellow's name（講師氏名）: Saptarshi GHOSH （ ID No. P19337 ）

- Name and title of the accompanying person（講義補助者の職・氏名）
Shuntaro TAKAHASHI , Associate Professor

- Participating school（学校名）: Tokushima Prefectural Jonan High School

- Date （実施日時）: 18/11/2020 （Date/Month/Year:日/月/年）

- Lecture title（講義題目）:
Introduction to the World of DNA: Structure, Function and Future

- Lecture format（講義形式）:
◆Lecture time（講義時間） 1 hour 40 min（分）, Q&A time（質疑応答時間） 15 min（分）
◆Lecture style（ex.: used projector, conducted experiments）
（講義方法（例：プロジェクター使用による講義、実験・実習の有無など））
We used projector for lecture and also demostrated a simple experiment to the students.

- Lecture summary（講義概要）: Please summarize your lecture within 200-500 words.

I divided my lecture into the following sections; Presentation and dicussions (50 min), Demonstration and quiz (25 min) and Scientific card game (25 min).

In my presentation, first I introduced my country (India) to the students. I gave them the idea about the geographical location, popullation, time zone and foods of India. I briefly introduced them about the indian culture and showed them varios landscapes found in india. For their easy understanding, I compared the each topic with Japan's similar subjects, so that they can relate. I told them some interesting ancient stories also from indian epics. Thereafter, I talked about my universty, from where I completed my education and I also showed them the photographs of my visit at Osaka University during my Ph.D. tenure (May, 2016). Then, I briefly introduced them to my current research place and research group before moving into the science part of my presentation. In the scientific part, I provided an overview of importance of DNA in our life processes. I started with genetics and heredity. Then I talked about the central dogma of gene expression, i.e., how protein is expressed from RNA taking the information from the DNA. After that, I discussed about the structure and function of the DNA double helix. Then I showed them

how the molecular environment around the DNA in cell can effect the duplex structure and functions. By the end of the scientific part, I tried to show them how sequence of DNA and molecular environment both are important for our gene expression.

In experimental demonstration, we showed them how can we monitor the duplex DNA formation by simple fluorescence quenching technique. We designed few DNA single strands labelled with either fluorophore or quencher at the end in a way that when a fluorophore labelled single strand hybridize with its complementary strand, fluorophore and quencher are in close promity. As a result, on duplex formation, fluorescence color of the fluorophore (green color) disappeared under the UV light. We made different combinations of four strands (two fluorophore and two quencher labelled) and asked the students that what color they expect under UV light for the solutions. They answered in a white board and we discussed the results with them after showing them the colors of the solutions under UV lamp.

After demonstration, we talked about the importance of DNA duplex stability in life processes and also in recent technologies like detecting corona virus by reverse transcription polymerase chain reaction (RTPCR). We described them about the method for determining duplex stability from its base sequence using nearest-neighbor model. To understand and realize the method physically, we played the DNA card game based on this model, invented by our research group. We divided the students in small groups and asked them to make the DNA duplex using the cards (actually DNA bases) in a way that the DNA contains more stable nearest-neighbor pairs. We decided the winner of the game who made the most stable duplex by adding the values of base pairs.

◆Other noteworthy information（その他特筆すべき事項）:

After interacting with the students, I realized their understanding and logic was very clear. Within a short time, they adopted the rules for the card game and played correctly. Some of them expressed their desire to study more about DNA technology in future.

- Impressions and commnets from the accompanying person（講義補助者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。）: この度は、サイエンスダイアログに参加する機会を与えてくださいましてありがとうございました。Ghosh 研究員のキャリアにとっても本企画は非常に有益であったと感じております。今回は 2 時間の時間をいただきましたので、講義に積極的に参加してもらうような工夫を随所に取り入れました。本事業はボランティアベースということで、こちらに内容は任せきりのケースが多いかと思います。ご担当の先生からは（おそらく JSPS 側からのやりとりの例に基づいてでしょうか）事前学習やプレゼン資料の書類の事前送付の連絡は来ましたが、当日書類を持参する生徒も少なく、学習効果があったかは不明でした。先方がなぜこの事業に申し込んだか、どんな講義を期待しているかということを明確に伝えてもらう方がやりやすいように感じました。今後は、受け入れ側が発表者側に要望を積極的にやりとりしなくてはいけない仕組みを設ける方が良いと思います。