

様式 A-1  
(FY2023)

2023年 7月 14日

## サイエンス・ダイアログ 実施報告書

1. 学校名・実施責任者氏名: 鳥取県立倉吉東高等学校 宋志連
2. 講師氏名: Dr. Michael W. COUNTRY (Mr.)
3. 講義補助者氏名: \_\_\_\_\_
4. 実施日時: 2023年 7月 7日 (金) 13:20 ~ 15:20
5. 参加生徒: 1年生 54人、\_\_年生 \_\_人、\_\_年生 \_\_人 (合計 54人)  
備考: (例:理数科の生徒) 1年生希望者
6. 講義題目: Mysteries of metabolism in the retina and in hibernation
7. 講義概要:
  - ・生徒の国際理解を深める  
文化や著名人などの母国のことや、海外で研究する意義
  - ・外国語習得(英語習得)の方法  
講師自身の経験から、どのようにして英語を上達させるか
  - ・生徒の科学への興味関心を高める  
研究内容を含め、網膜や冬眠に関すること。高校の教科書レベルの内容から研究内容まで
8. 講義形式:
  - 対面 ・ オンライン (どちらか選択ください。)
  - 1) 講義時間 110分 質疑応答時間 10分
  - 2) 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)  
プロジェクター使用による講義
  - 3) 事前学習  
○有・無 (どちらかに○をしてください。)  
使用教材 Goldfish and crucian carp are natural models of anoxia tolerance in the retina  
Michael W. Country, Michael G. Jonz
9. その他特筆すべき事項:

Form B-2  
(FY2023)  
Must be typed

Date (日付)  
10日7月2023年 (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): Michael Country (ID No.P20758)

- Name and title of the accompanying person (講義補助者の職・氏名)

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- Participating school (学校名): Tottori Prefectural Kurayoshi Higashi High School (鳥取県立倉吉東高等学校)

・ - Date (実施日時): 2023年7月7日 (Date/Month/Year: 日/月/年)

- Lecture title (講義題目):

Mysteries of metabolism in the retina and in hibernation

- Lecture format (講義形式):

◆  Onsite ・  Online (Please choose one.)(対面 ・ オンライン)((どちらか選択ください。))

◆ Lecture time (講義時間) 120 min (分), Q&A time (質疑応答時間) 10 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))

Projector

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

My name is Michael Country, and I am a Canadian scientist working at RIKEN, Japan. My research is about metabolism, which is the study of how cells get energy to survive. In this talk, I'll discuss the benefits of studying and working abroad. I'll give a couple tips to improve your English. Finally, I'll also discuss three of my favourite research projects.

First, in Canada, I studied goldfish eyes. Goldfish can survive for hours without oxygen. This is amazing, right? If humans could do this, we wouldn't die from heart attacks or strokes. I studied goldfish metabolism in the retina, which is the neural tissue in the back of the eye that lets you see. I showed that mitochondria sense when oxygen is low, and they keep Ca<sup>2+</sup> low to avoid cell death.

Secondly, I collaborated with a friend in Denmark to compare blood supply in animal eyes. The retina needs to get blood for energy. But it also needs to be transparent, and blood is

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※弊会記入欄

dark so it prevents light from entering. How can you get oxygen to the eye without blood vessels? We named this problem the “opto-respiratory showed how fish, reptiles, birds, and mammals solve this problem, and we named this the opto-respiratory compromise (opto- means “light”).

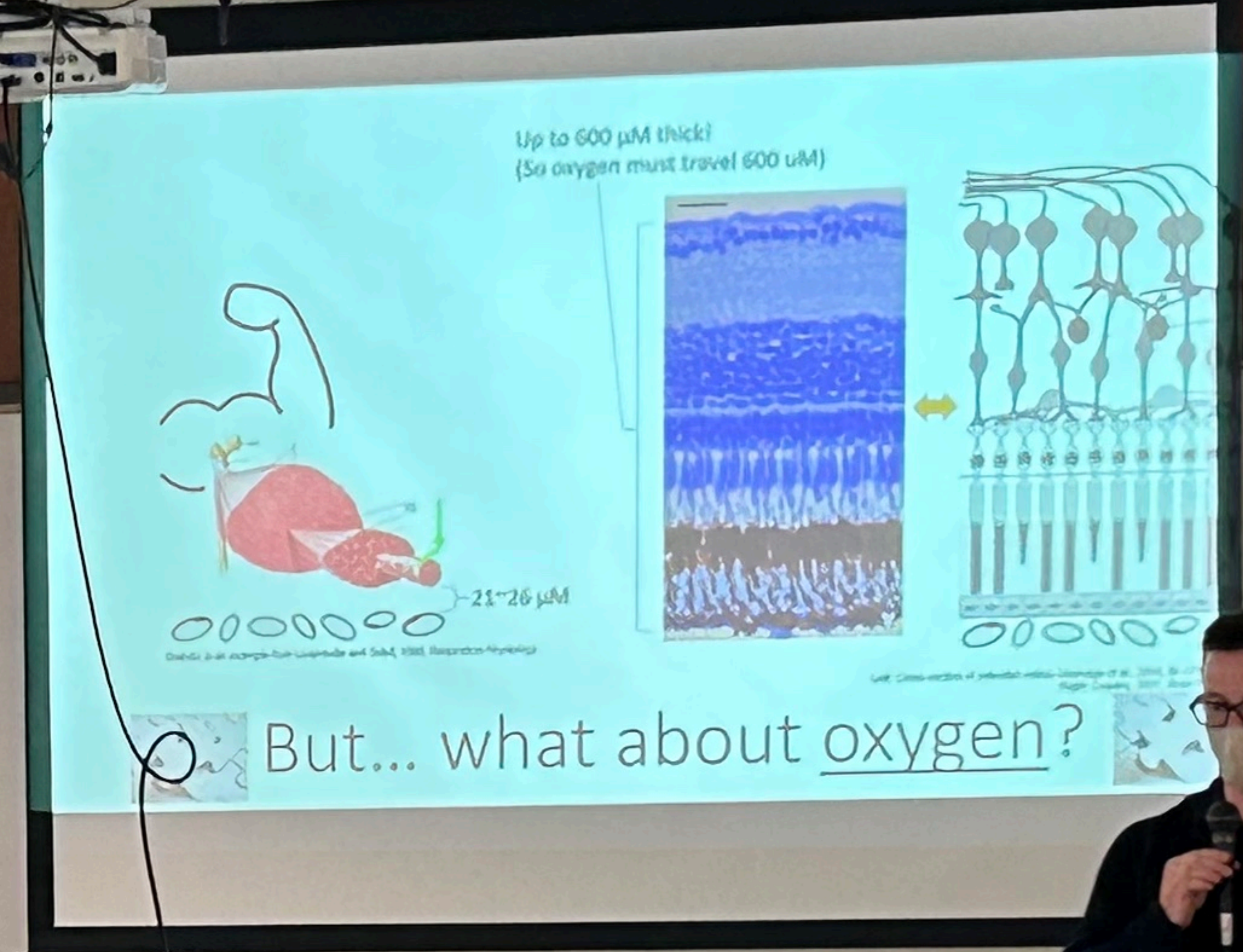
And lastly, in America and Japan, I have been studying how animals hibernate. We know the brain starts the process of hibernation. But after it starts in that one part of the brain (the hypothalamus), what is the next step? Does the brain release a hibernation chemical (a hormone) into the blood? Or does it change brain activity in the rest of the brain, kind of like how we sleep? I'll describe an experiment I'm doing to learn how animals hibernate. If we answer this question, maybe we can make humans hibernate too, which could save lives during heart attacks, strokes, and organ transplantation.

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

- I sent a word list, academic articles, images, and more to the host in advance.

- Impressions and comments 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。):

It was a great time!



Up to 600  $\mu\text{m}$  thick!  
(So oxygen must travel 600  $\mu\text{m}$ )

21-26  $\mu\text{m}$

600  $\mu\text{m}$

But... what about oxygen?

A classroom full of students in white and blue uniforms, sitting at desks with laptops, facing a lecturer at the front. The students are mostly seen from the back, looking towards the front of the room where the lecturer is standing. The room has wood-paneled walls and a large whiteboard behind the lecturer. A projector screen is mounted on the wall, displaying the slide content.