

様式 A-1  
(FY2025)

2026 年 2 月 26 日

## サイエンス・ダイアログ 実施報告書

1. 学校名: 長野県諏訪清陵高等学校
2. 講師氏名: Dr. Muhammad Adnan SABAR
3. 講義補助者氏名: 平井 聡一郎 様
4. 実施日時: 2026 年 2 月 20 日 (金) 14:00 ~ 16:00
5. 参加生徒: 1 年生 8 人、 2 年生 24 人 (合計 32 人)  
備考: 2 学年沖縄研修参加者と希望者
6. 講義題目: Spread and Control of Antibiotic Resistant Bacteria in Water Environment  
水環境中の薬剤耐性菌の拡散と制御
7. 講義概要: 自己紹介、出身国紹介、研究内容、日本での生活
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 90 分 質疑応答時間 30 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 (どちらか選択ください。)  
使用教材: abstract の配布
9. その他特筆すべき事項:

Form B-2  
(FY2025)  
Must be typed

Date (日付)  
24/02/2026 (Date/Month/Year: 日/月/年)

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

- Fellow's name (講師氏名): Muhammad Adnan SABAR (ID No. P24393 )

- Name and title of the lecture assistant (講義補助者の職・氏名)  
Soichiro Hirai

- Participating school (学校名): Nagano Prefectural Suwa Seiryō High School

- Date (実施日時): 20/02/2026 (Date/Month/Year: 日/月/年)

- Lecture title (講義題目):  
Spread and Control of Antibiotic Resistant Bacteria in Water Environment

- 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) 100 min (分), Q&A time (質疑応答時間) 20 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))  
Used a Screen and brought influent and effluent water samples from the WWTP

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

This lecture addressed antimicrobial resistance (AMR), one of the most critical global health challenges of our time. Beginning with a personal introduction about my background, motivation for becoming a scientist, and home country, I aimed to connect with students while establishing the global nature of this issue.

The presentation commenced by highlighting the severity of AMR, which currently causes approximately 700,000 deaths annually worldwide, with projections reaching 10 million deaths by 2050 if left unaddressed. I then introduced students to the fundamentals of antibiotics, starting with Alexander Fleming's discovery of penicillin in 1928, and explained how different antibiotic classes work through distinct mechanisms:  $\beta$ -lactams disrupt bacterial cell wall synthesis, quinolones inhibit DNA replication, and aminoglycosides interfere with protein synthesis. The lecture then explored how bacteria develop resistance and transform into "superbugs" through three primary mechanisms: efflux pumps that expel antibiotics, enzymatic degradation of drugs, and mutations in target sites.

A significant portion of the presentation focused on wastewater's critical role in AMR dissemination, emphasizing the "One Health" concept that connects human, animal, and environmental health. I explained how wastewater treatment plants (WWTPs) help mitigate AMR spread by reducing bacterial loads before releasing water into the environment. However, I also shared my original research findings on AMR in wastewater and environmental waters including combined sewer overflows (CSOs) during rainfall events significantly impact AMR profiles in urban rivers. The presentation concluded by inspiring students to recognize their potential role in addressing this global challenge. I emphasized how scientific research in this field directly benefits humanity worldwide and encouraged students to consider contributing to the fight against AMR, connecting molecular biology concepts with real-world environmental and public health applications.

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

Everyone at the school, including teachers and staff, were very welcoming and helpful. The students were interested in learning about antimicrobial resistance, stayed focused and engaged throughout the talk, and made the Q&A section lively and interesting.

- Impressions and comments from the lecture assistant (講義補助者の方から、本プログラムに対する意見・感想等がありましたら、お願いいたします.):

Good experience, presentation was being both informative and engaging.