View results

Respondent

13 Quanhui Ye

122:21
Time to complete

1. Date of this semester progress report submission *

12/15/2025

2. Name of project exactly as it was listed in your award letter *

Quanhui Ye

3. Date of original award letter *

4/29/2025

4. Date of expiration listed on award letter (or on scope change approval if more recent) *

4/29/2027

5. How much was your award (i.e., original award plus any approved budget increases)? *

13848

6. How much of your award has been spent to date (in dollars)? *

2496.48

7. Date of forecasted project completion *

05/15/2026

8. Have you submitted one or more semester progress reports previously? *

- ( ) YES
- (•) NO

9. Describe, in detail, what has been completed on the project since the last semester progress report (or since the project commenced if you have not yet submitted a semester progress report)? *

1) We successfully constructed multiple surface-displayed nuclease biocatalysts and systematically evaluated their performance. Among them, two nuclease biocatalysts exhibited high degradation activity against a broad range of antibiotic resistance genes under both controlled buffer conditions and in real-world wastewater samples. We further comprehensively characterized their biocatalytic properties and found that gene degradation was rapid, with detectable activity occurring within 30 seconds. The nuclease biocatalysts also demonstrated robust performance at environmentally relevant temperatures (23 °C and 30 °C) and retained strong activity after more than one month of storage, indicating excellent stability and long shelf life.
2) Two undergraduate students from the molecular and cellular biology department and the chemical engineering department contributed to the project by helping perform literature reviews and running characterization tests both under guidance and independently. The students gained experience with performing hands-on research and understanding literature.

10. Describe, in detail, the project's challenges/obstacles since your last semester progress report (or since the project commenced if you have not yet submitted a semester progress report)? *

A major challenge of this project was identifying highly active nuclease candidates that retain strong activity when displayed on the cell surface. To address this challenge, we synthesized multiple nuclease genes and constructed a series of surface-displayed biocatalysts for systematic activity evaluation. Another key challenge was integrating the display cassette into the host genome to generate a marker-free strain while simultaneously ensuring stable and robust gene expression.

11. Describe, in detail, the project's successes since your last semester progress report (or since the project commenced if you have not yet submitted a semester progress report)? *

1) We successfully constructed multiple surface-displayed nuclease biocatalysts and systematically evaluated their performance. Among them, two nuclease biocatalysts exhibited high degradation activity against a broad range of antibiotic resistance genes under both controlled buffer conditions and in real-world wastewater samples. We further comprehensively characterized their biocatalytic properties and found that gene degradation was rapid, with detectable activity occurring within 30 seconds. The nuclease biocatalysts also demonstrated robust performance at environmentally relevant temperatures (23 °C and 30 °C) and retained strong activity after more than one month of storage, indicating excellent stability and long shelf life.
2) Two undergraduate students from the molecular and cellular biology department and the chemical engineering department contributed to the project by helping perform literature reviews and running characterization tests both under guidance and independently. The students gained experience with performing hands-on research and understanding literature.

12. Did your project have any changes to its team that SSC should know about (e.g., project lead, faculty/staff advisor, departmental financial contact)? *

NOTE: If yes, please complete the SSC Project Contact Information Change Form located at this link: https://forms.office.com/r/uBjx9nmNpG

- ( ) YES
- (•) NO

13. Complete and upload the semester financial documentation for your project. You should reflect all expenditures since your last semester project report. We strongly suggest that you also upload supporting financial documentation from Banner for your award CFOP. NOTE: When your project is completed and/or expired (whichever comes first), any remaining project funds will be transferred back to the SSC.

https://studentengagement.illinois.edu/sites/default/files/2024-09/SSC-Budget-Timeline-SEMESTER-PROGRESS-REPORT-template.xlsx
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SSC-Budget-Timeline-SEMESTER-PROGRESS-REPORT-_Quanhui Ye.xlsx

14. (OPTIONAL FOR SEMESTER REPORT) Upload project marketing and/or media not previously submitted in semester progress reports.

NOTE: Project marketing and/or media must include SSC's logo and/or a statement of which fee(s) funded the project.