

C-Kit Education

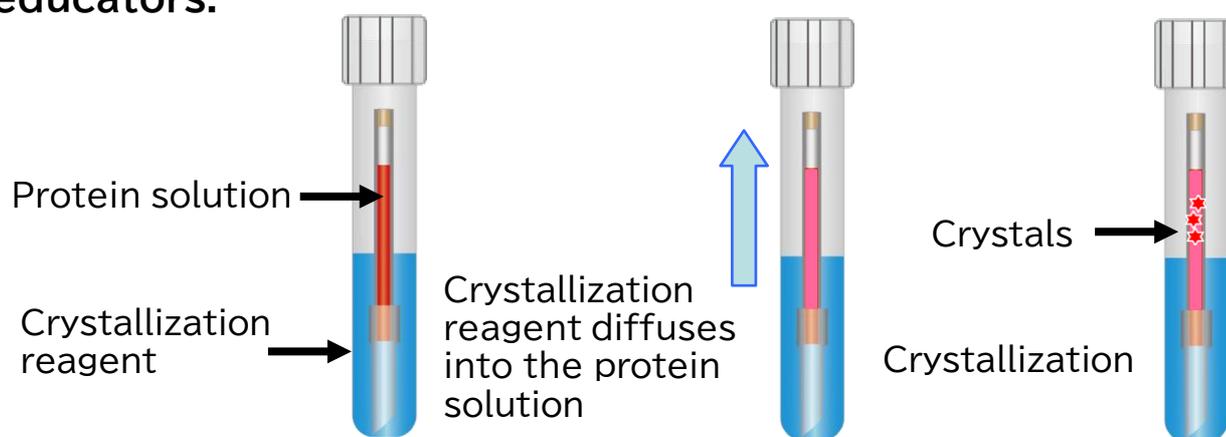
For science literacy study



C-Kit Education (CRT130-1E and 3E) are experimental kits for group learning on the theme of protein crystal growth. Students investigate the effect of crystallization reagents (NaCl or KCl) on lysozyme crystal growth using the counter diffusion method*.

Through this experiment, students develop scientific literacy by designing experiments, mixing reagents, performing precise laboratory procedures, observing crystal growth over time, and analyzing and discussing results collaboratively.

The kit includes detailed student instructions with web-based instructional videos, and a teacher's guide for educators.



* Mechanism of Crystallization Using the Counter-Diffusion Method

In this experiment, a crystallization reagent slowly diffuses into a lysozyme solution, and generates various forms of crystals or precipitates depending on the type and concentration of the reagent.

Suggested Lesson Flow

- 1, Discuss how to determine the optimal salt concentration for growing large, well-shaped (high-quality) lysozyme crystals. Set three concentration conditions for each salt (NaCl and KCl) and create a mixing protocol for them.
- 2, Conduct crystallization experiments and observe crystal growth on Days 7, 14, and 21.
- 3, Estimate the optimal concentration for each salt, and conduct confirmation experiments at nearby concentrations (four trials). Observe the crystals as before to confirm the reproducibility.
- 4, Compare the effectiveness of NaCl and KCl and discuss differences in crystal growth behavior.
- 5, Students present and discuss their experimental results in an interactive, whole-class discussion.

C-Kit Education



Name	Crystal Preparation Kit		
Model	CRT130-1E		Suggested retail price: 22,000 yen (transportation fee, tax, not included)
No.	Product name	Qty.	Description
1	Capillary (ϕ 0.7 mm \times 47 mm)	10	For growth crystals inside. Both ends are round cut.
2	Gel tube (ϕ 1.0 mm \times 1 cm)	10	For placing between protein solution and crystallization reagent. Soaked in 50 mM acetate buffer solution.
3	Space grade lysozyme 25 mg/mL, ca. 0.14 mL (for 10 tests)	1	Collect all of the protein solution at the bottom of the tube. Dissolved in 50 mM acetate buffer solution.
4	2 M NaCl solution for crystallization reagents (5 mL)	1	For crystallization reagents.
5	2 M KCl solutions for crystallization reagents (5 mL)	1	For crystallization reagents.
6	250 mM acetate buffer solution (5 mL)	1	Crystallization solutions for lysozyme are required to contain 50 mM acetate buffer solution (pH 4.5).
7	Dilution solution for crystallization reagents (20 mL)	1	For crystallization reagents.
8	Sealing compound	1	For sealing the capillary end.
9	Screw cap tube	3	2 for diluted salt sols. if necessary, and 1 for reserve.
10	1 mL syringe	10	4 for salt sols. 2 for buffer sol. 2 for dilution sol., and 2 for diluted salt sols. if necessary.
11	Syringe tip parts	10	For attaching to the tip of the syringe.
12	Clear round-bottom tube (5 mL)	12	10 tubes for setting up crystal growth, and 2 for reserve.
13	Paper test tube stand	1	
14	Polarizing plate set	1	For crystal observation.
15	Instructions	1	

Name	Crystal Observation Set		
Model	CRT130-3E		Suggested retail price: 3,500 yen (transportation fee, tax, not included)
No.	Product name	Qty.	Description
1	Loupe	1	Observe from above the polarizing plates
2	LED push light	1	Crystals sandwiched between polarizing plates are placed on this and irradiated from below.
3	AA battery	3	For push light

Manufactured by:
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