

# Cornell Guided Notes

Genetics of Disease (Medical Interventions) | 2026-11-23

Name

Period

Date

Lesson

## Lesson focus

Cloning and purification workflow

## Key words and questions

## Prepared details and student notes

**Essential question**  
**What is today's target?**

Carry out a cloning and protein-purification workflow and record results at each step. Big idea: Bacterial transformation followed by selection and purification is the core pipeline for producing recombinant proteins.

**My notes, examples, and questions**

**Key words**  
**What vocabulary unlocks the lesson?**

- plasmid
- recombinant DNA
- ligase
- transformation
- expression

**My notes, examples, and questions**

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## Cornell Notes - Continued

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**Must-know ideas**  
**What should I understand by the end?**

- Heat shock or electroporation opens pores in bacterial membranes so plasmid DNA can enter.
- Antibiotic selection kills non-transformed cells; only cells carrying the resistance gene survive.
- The first purification step separates soluble protein from cell debris before chromatography.

**My notes, examples, and questions**

**Process notes**  
**What happens during class?**

- 0-10: Review protocol; gather materials; confirm lab setup
- 10-30: Transformation step: introduce plasmid into host cells per protocol
- 30-45: Selection: plate or score cells; count or estimate transformed colonies
- 45-60: Purification step: run first isolation; identify fraction with target protein
- 60-72: Record yield and quality observation in workflow data table
- 72-80: Clean up; submit data table to course shell

**My notes, examples, and questions**

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#### Steps and evidence What do I do and turn in?

- Read the workflow protocol in the PLTW course shell and gather your materials.
- Model transformation by introducing the recombinant plasmid into host cells.
- Select transformed cells using the provided marker and record how many grew.
- Run the simulated purification step and note where the target protein appears.
- Record yield and one quality observation in your workflow data table.
- Submit your cloning and purification workflow results.

Evidence: Lab report - Cloning and purification workflow data table recording transformation results, selection counts, fraction data, yield, and a quality observation.

#### My notes, examples, and questions

#### Checks for understanding How do I know I got it?

- You'll be able to carry out transformation, selection, and purification steps.
- You'll be able to record yield and a quality note from your workflow.

#### My notes, examples, and questions

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**Lab or safety notes**  
**What must I handle carefully?**

**Safety:**

- Wear nitrile gloves and safety goggles throughout the procedure.
- Treat all bacterial cultures as BSL-1 organisms: avoid mouth contact and wash hands before leaving lab.
- Dispose of all biological waste (plates, tubes, tips) in designated biohazard bags.
- Wipe bench with 10% bleach or 70% ethanol before and after use.
- Report any spill involving bacterial culture to the teacher immediately.

**Supplies:**

- Recombinant plasmid sample (or bacterial transformation kit per PLTW protocol)
- Host bacterial cells (competent E. coli or equivalent)
- Antibiotic selection plates (appropriate to resistance marker on plasmid)
- Heat-shock or ice bath setup (water baths at 4 degrees C and 42 degrees C)
- Micropipettes and sterile tips (10 uL, 100 uL, 1000 uL)
- Microcentrifuge tubes (1.5 mL)
- Inoculating loops or cell spreaders

**My notes, examples, and questions**

## Summary

Today's lesson focused on Cloning and purification workflow. The main target was: Carry out a cloning and protein-purification workflow and record results at each step. The evidence of learning is Lab report: Cloning and purification workflow data table recording transformation results, selection counts, fraction data, yield, and a quality observation.. In my own words, the most important idea from today is:

**My summary**

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My final question or connection