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**Objective:**

Use AI to assist students in Microbiology labs by improving decision-making in selecting appropriate culture media for different bacteria.

**Use Case:**

**Student Support in Microbiology Practical Labs**

**The Problem:**

Students often struggle to choose the correct **culture media** for growing specific bacterial strains during lab practicals. This results in:

* Repeated experimental failures
* Wasted lab resources (media, time, reagents)
* Frustration and poor academic performance
* Delayed learning outcomes due to high dependency on lab instructors

**Proposed AI Agent:**

**MediBot: The Microbiology Media Mentor**

A virtual AI lab assistant embedded in the university's e-learning portal or accessible via mobile/tablet in the lab.

**Key Features:**

* Chat-based AI agent trained on a curated database of bacteria, culture media types (selective, differential, enriched, minimal), and practical use cases
* Accepts queries like “Which medium for *Staphylococcus aureus*?” or “I want to test lactose fermentation”
* Suggests primary and alternative media, including preparation tips
* Explains *why* a particular media is used (e.g., differential property, nutrient composition)
* Can generate a quick-reference media preparation guide (in PDF)

**Impact:**

1. **⏱️ 60% Time Saved During Lab Setup**
Students get instant, accurate answers without waiting for faculty input or textbook reference.
2. **🎯 50% Increase in Practical Accuracy**
More students choose the correct media and complete successful experiments on the first attempt.
3. **📚 Improved Learning Retention**
By explaining “why” a media is chosen, students build stronger microbiology fundamentals.

**User Interaction Sketch**

🧪 Student: I need to grow \*E. coli\* from a soil sample.

🤖 MediBot: Use Nutrient Agar for general growth. If you're screening for lactose fermentation, use MacConkey Agar (selective & differential).

🧫 Student: What’s the composition of MacConkey Agar?

🤖 MediBot: MacConkey contains peptone, lactose, bile salts, neutral red, and crystal violet. It inhibits Gram-positive bacteria and differentiates lactose fermenters.

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