Never fail flowcharts
For use in Microbiology Lab - BIOL 225
How to begin

• Follow directions!

  • “To start your flow chart, you will separate gram positive organisms from gram negative organisms using Crystal Violet (selects for gram negative) and Phenylethlyl alcohol agar plates (selects for gram positive). You will then confirm using a gram stain.”

  • “Do not use staining morphology, colony morphology, growth characteristics, or litmus milk” --- these tests will be used *only* for confirmation

(quotes from your instruction sheet)
MIXTURE

Gram Negative Organisms:
- Alcaligenes faecalis
- Alcaligenes viscolactis
- Citrobacter freundii
  Etc.

Gram Positive Organisms:
- Bacillus subtilis
- Bacillus cereus
- Bacillus megaterium
- Corynebacterium diptheriae
- Corynebacterium xerosis
  Etc.

• Determination of Gram Negative or Gram Positive can be further confirmed through staining procedures

• Media Needed:
  • 1 Crystal Violet plate
  • 1 PEA plate
What’s Next?

• Congrats! You have now done the easy part (grouping all 31 organisms into gram positive and gram negative)- so now what?
  • Focus on one group at a time
  • Find the characteristics that set certain organisms apart from others in the group
    • e.g *A. faecalis* and *A. viscolactis* are both gram negative and have all the same characteristics... **except** *A. faecalis* tests positive for Dextrose (with gas) and also for Phenylalanine deaminase
  • Utilize these characteristics to continue your flow chart
Gram Negative Organisms:

- *Alcaligenes faecalis*
- *Alcaligenes viscolactis*

Phenylalanine deaminase test:
- (+) *A. faecalis*
- (-) *A. viscolactis*

Media Needed (updated)
- 1 crystal violet plate
- 1 PEA plate
- 1 Phenylalanine deaminase test tube
Why’d you choose that test?

• The **two** differences between *A. faecalis* and *A. viscolactis* were dextrose and phenylalanine deaminase.

• So why did we pick phenylalanine deaminase instead of dextrose???

• **Check out those fact sheets!**
  • Note that Dextrose results have an *
  • * (on the fact sheets) indicate unexpected results, which may mean that your results can be incorrect.
    • Incorrect results may skew your ability to determine organisms, so it *may* be better to avoid them (if possible), but of course, is not mandatory
That seems too easy...

- Well it *is* that simple (except you have 31 organisms, and we only used 2!)

- **Tips for making it easier:**
  - Figure out which test you will use to make the final determination of each organism by finding its unique characteristics.
  - Work backwards through these tests so you can combine tests to help determine between subsequent groups
    - e.g. group 1 was gram negative, maybe group 2 is urease test, and group 3 is phenylalanine deaminase
  - Once you’ve worked backwards, go through it forwards again to be sure everything makes sense!
Other tips to ease your pain

• Make a list
  • List out all the gram positive/gram negative organisms
    • Write out the tests that are unique to each organism
    • Highlight tests that will help you further group the organisms so that you can use the least media possible
  • Make a smaller sample flow chart first!
    • Make sure it works out, then start your final copy
      • Make your final copy on 11x14 paper
      • Use pencil first then go over in marker/pen/crayon/paint etc.

• Color code!
  • Use different colors to determine +/- results (especially if there will be color changes in your actual tests!)
Final words

• Although it may seem daunting at first, the creation of the flow chart and using it is really not terribly difficult, just a bit time consuming.
• If you think logically through it (and utilize the tips to keep yourself organized) it should be pretty easy to complete!
• Remember to use your resources- there is an example in your lab notebook, you have full page documents of information on all 31 organisms, and you have us (the ARC tutors)
• Good luck and have fun!
Works Cited and sources

• 2012 flowchart organisms. Dr. Spink, Andrew Martin and Paul Marks. 2009.
• Flowchart Assignment Instructions. Dr. Spink. 2012
• Prepared by Melanie Koto

Sources
• How to make a flow chart in Excel
  • http://www.breezetree.com/articles/how-to-flow-chart-in-excel.htm
• How to make a flow chart in Word
• Utilizing specific symbols for thought process