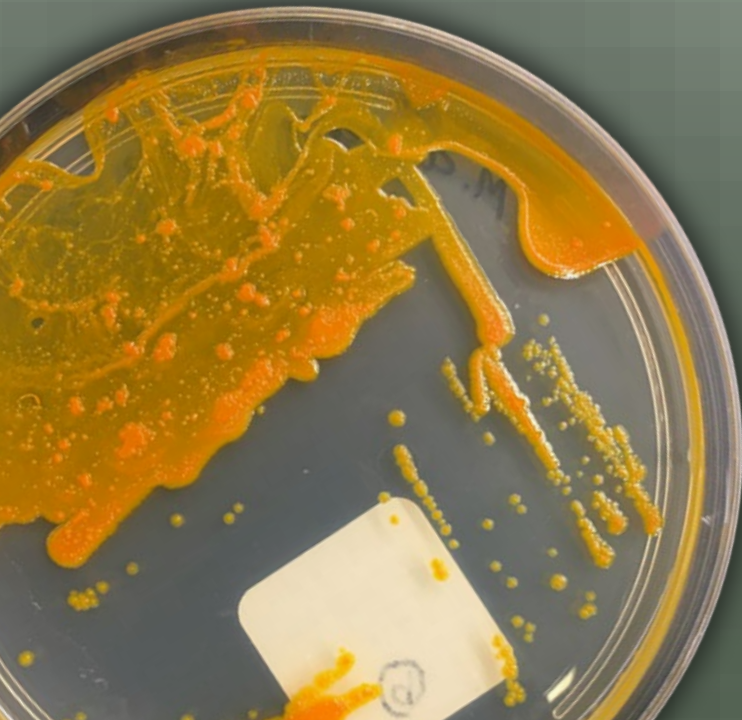


INFECTIOUS DISEASE

APHL-CDC FELLOWSHIP
JADE BALKEMA

MISSOURI SPHL



Background

- Michigan State University (2022)
 - Biomedical Laboratory Diagnostics with a Medical Microbiology Concentration and a Minor in Spanish
 - Introduction to public health
- APHL-CDC Fellowship (August 2022-Present)
 - BSL-3 Tuberculosis Laboratory (2022-2023)
 - Enteric Bacteriology (2023-2024)

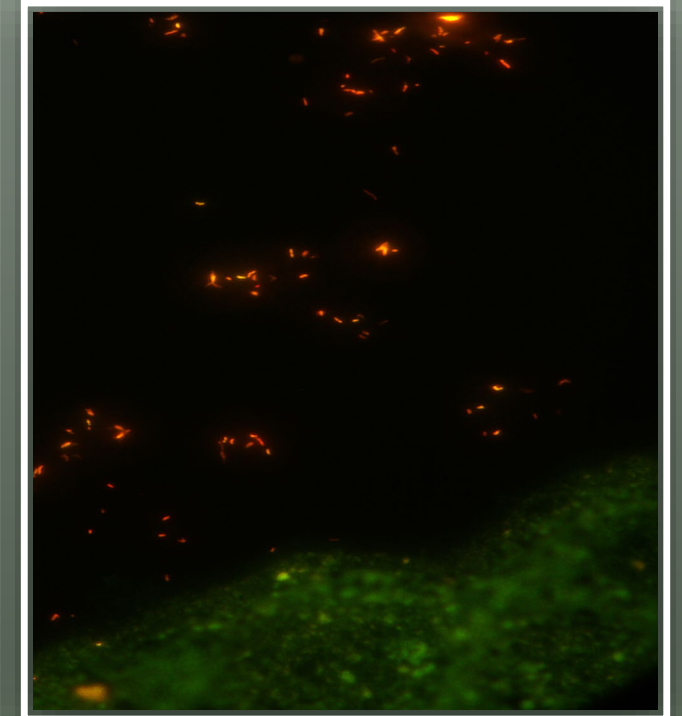
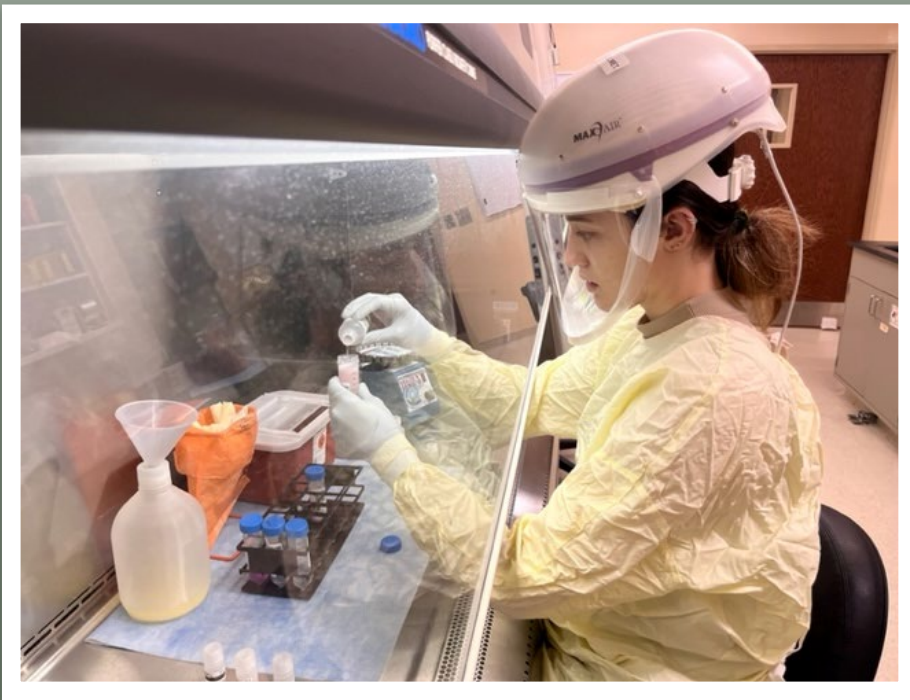


Mycobacterium tuberculosis Specimen Processing

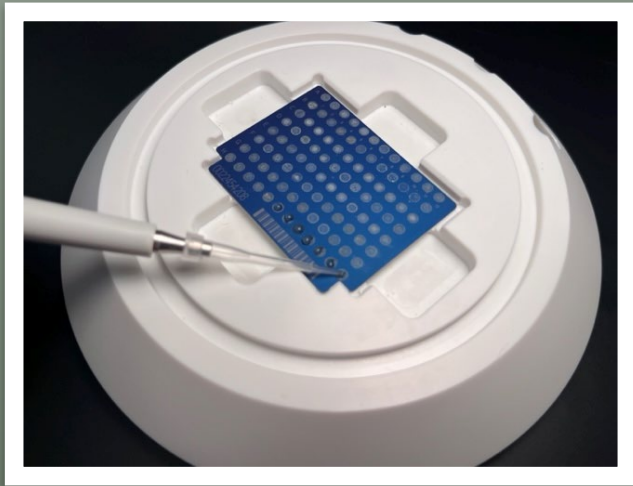
- Processing of clinical specimens using commercial NaOH-NALC method serves two purposes: decontamination and digestion
- NALC: digestion agent that breaks up thick mucus in a sputum specimen and release bacteria
- NaOH: decontamination reagent that kills other bacteria present in the raw specimen



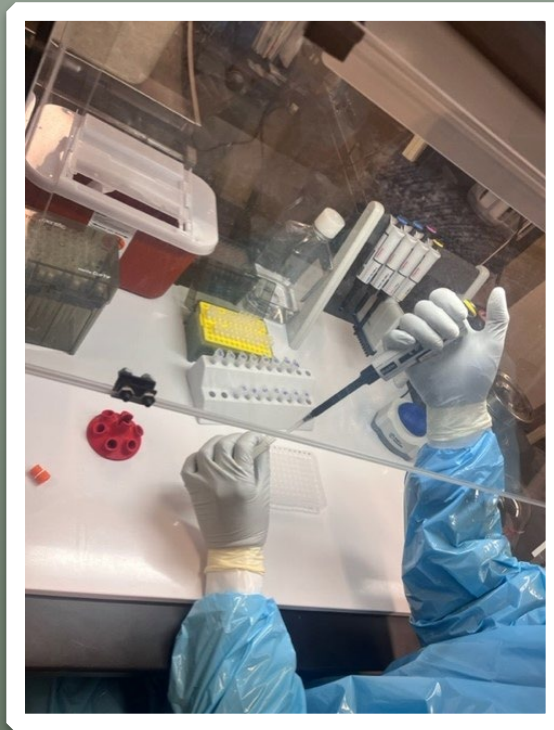
Detection of Acid Fast Bacilli



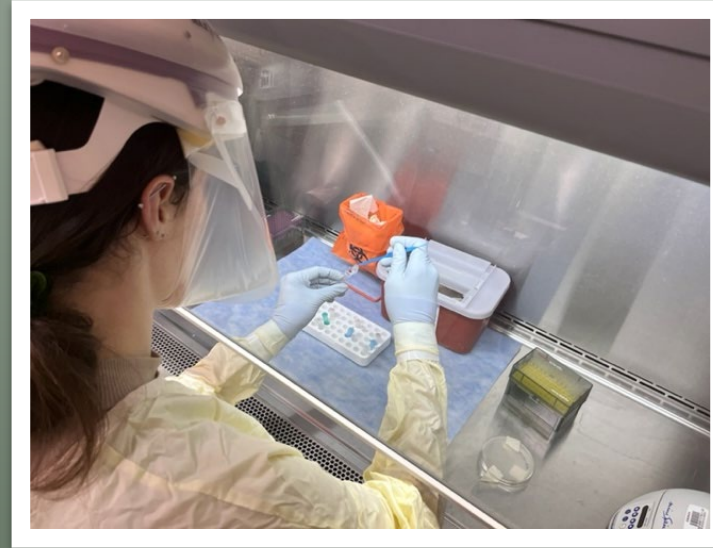
Confirmation of *Mycobacterium tuberculosis*



MALDI-TOF



PYROSEQUENCING



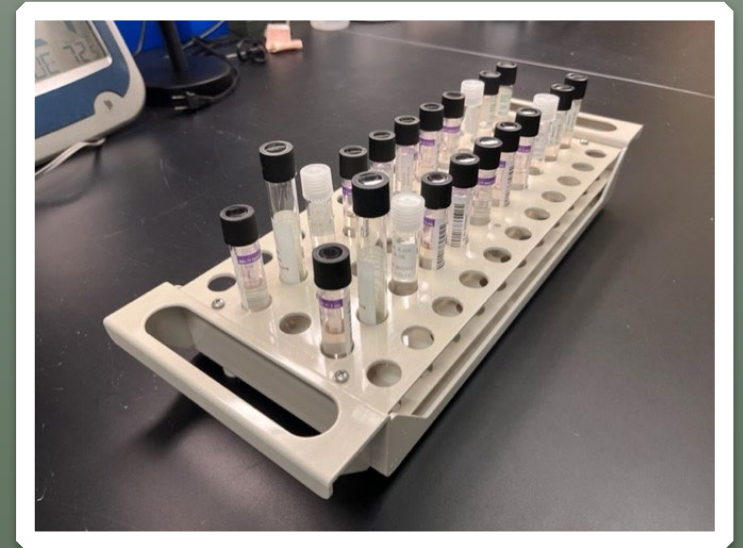
POLYMERASE CHAIN
REACTION (PCR)



QUANTIFERON TB-GOLD
PLUS (IGRA)

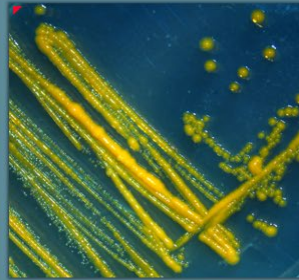
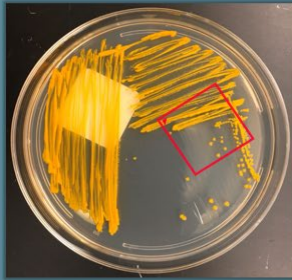
Drug Susceptibility Testing

- Determination of primary drug susceptibility in each case of TB
- Isolates grown in liquid media in the presence of RIPE drugs
 - 0.1 Isoniazid
 - 0.4 Isoniazid
 - Rifampin
 - Ethambutol
 - Pyrazinamide



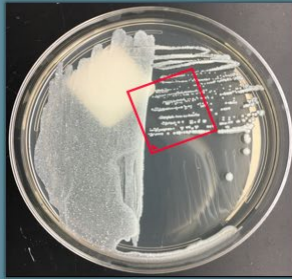
Mycobacterium Image Database





Mycobacterium gordonae / paragordonae

SCOTOCHROMOGENIC (Runyon-II)
Pigmentation: Yellow-Orange
Colony Morphology: Small, Regular, Smooth
Pictured growth media: Middlebrook 7H11 @ 28° C
Growth Duration: 20 days



Mycobacterium abscessus / chelonae

RAPID GROWING (Runyon-IV)
NO PIGMENT < 6 WEEKS
Colony Morphology: Small, regular and Smooth, commonly forms lawns.
Pictured growth media: Middlebrook 7H11 @ 28° C
Growth Duration: 20 days



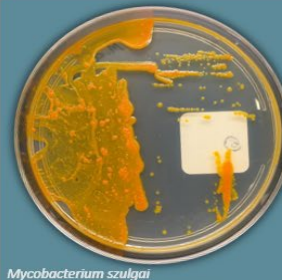
Mycobacterium terrae complex

RAPID GROWING (Runyon-IV)
NO PIGMENT < 6 WEEKS
Colony Morphology: Small, regular and Smooth, typically forms lawns [wet]
Pictured growth media: Middlebrook 7H11 @ 28° C
Growth Duration: 28 days



Mycobacterium mucogenicum

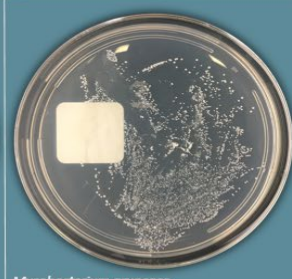
RAPID GROWING (Runyon-IV)
NO PIGMENT < 6 WEEKS
Colony Morphology: Small, regular and Smooth, typically forms lawns
Pictured growth media: Middlebrook 7H11 @ 28° C
Growth Duration: 20 days



Mycobacterium szulgai
SCOTOCHROMOGENIC (RUNYON II)
PIGMENTATION: ORANGE/YELLOW
MORPHOLOGY: SMALL REGULAR
PICTURED: 7H11 @ 37°C 21 DAYS

Mycobacterium asiaticum
PHOTOCHROMOGENIC (RUNYON I)
PIGMENTATION: YELLOW/ORANGE
MORPHOLOGY: REGULAR ROUGH
PICTURED: 7H11 @ 37°C 21 DAYS

Mycobacterium kansasii
PHOTOCHROMOGENIC (RUNYON I)
PIGMENTATION: YELLOW/ORANGE
MORPHOLOGY: REGULAR ROUGH
PICTURED: 7H11 @ 37°C 21 DAYS



Mycobacterium terrae complex
NONCHROMOGENIC (RUNYON III)
PIGMENTATION: IVORY/CREAME
MORPHOLOGY: SMALL REGULAR
PICTURED: 7H11 @ 37°C 28 DAYS

Mycobacterium simiae
NONCHROMOGENIC (RUNYON III)
PIGMENTATION: IVORY/CREAME
MORPHOLOGY: SMALL REGULAR
PICTURED: 7H11 @ 37°C 28 DAYS

Mycobacterium arupense
NONCHROMOGENIC (RUNYON III)
PIGMENTATION: IVORY/CREAME
MORPHOLOGY: SMALL REGULAR
PICTURED: 7H11 @ 37°C 28 DAYS



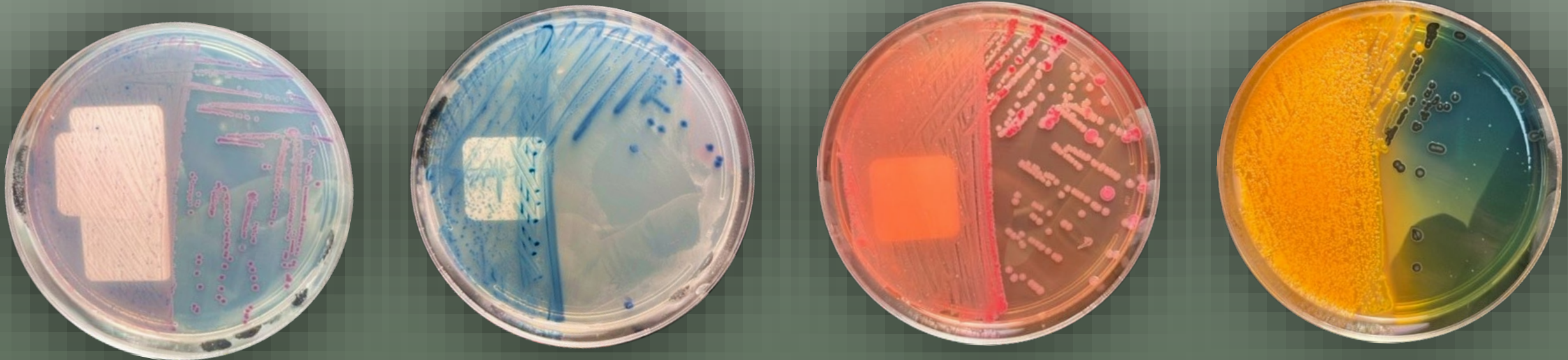
Mycobacterium immunogenum
RAID GROWING (RUNYON IV)
PIGMENTATION: IVORY/BONE
MORPHOLOGY: IRREGULAR UMBONATE
PICTURED: 7H11 @ 30°C 21 DAYS

***Corynebacterium auris* (contaminant)**
Contaminant capable of outcompeting
Mycobacterium for resources
even on selective media.
PICTURED: 7H11 @ 30°C 35 DAYS

***Gordonia bronchialis* (fringe AFB)**
Member of a small group of Acid Fast Bacilli
Not in the genus Mycobacterium.
DEVELOPES PIGMENT > 6 WEEKS
PICTURED: 7H11 @ 30°C 42 DAYS

Enteric Bacteriology

- Detection of Enteric Organisms
 - Campylobacter, Salmonella, Shigella, and Shiga-toxin producing E. coli



Enteric Bacteriology



Tentative Rotation



PARASITOLOGY

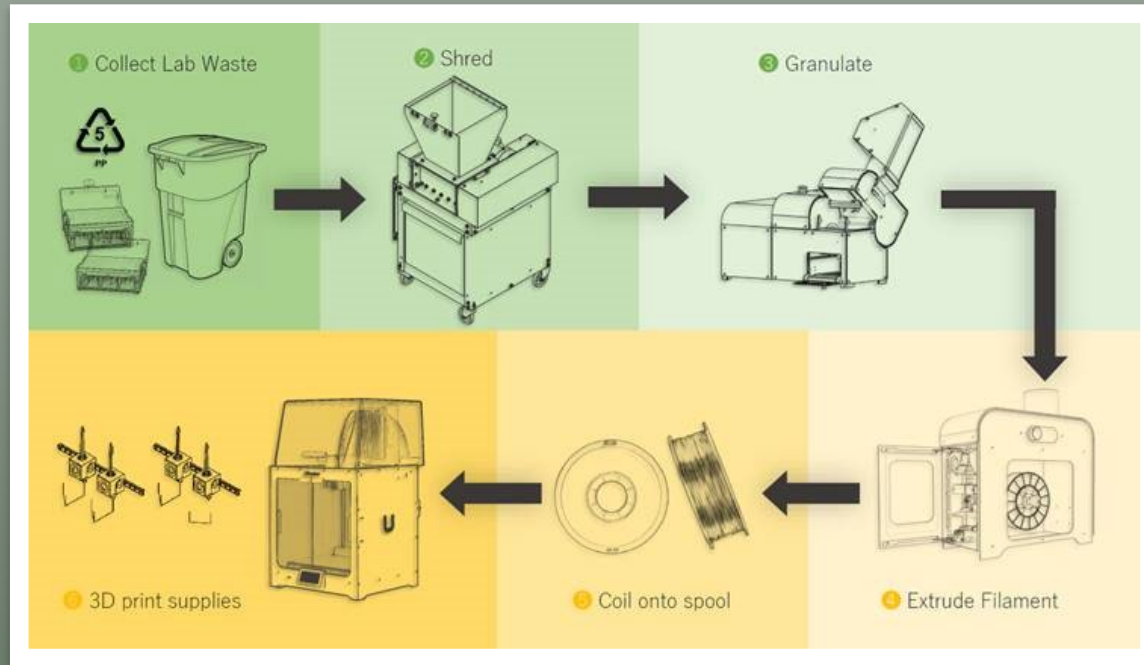


PERTUSSIS



MEDIA

Tentative Rotation



RECYCLING PROGRAM

For more information contact:
Richard Sapp M(ASCP)
Richard.Sapp@health.mo.gov

Reflection

- Learning and refining new skills
- Shadowing specialists
- Motivating work environment
- Developing a network



FUTURE PLANS

- ASCP Technologist in Microbiology Certification
- Pursue Master's in Microbiology
- Continue career in Public Health

