Tikrit University
College of Veterinary Medicine

Lect.7: Microbiology

Subject name: ***Mycobacterium***

Subject year:Third-year

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Mycobacterium

Types of veterinary important mycobacterium :-

1. Mycobacterium tuberculosis infects human causing tuberculosis disease, non- pigment producing

2. Mycobacterium bovis infects cows and human causing bovine tuberculosis, non- pigment producing

3. Mycobacterium kansasii infects deers, cows and suis causing tuberculosis like disease and produce pigment (yellow color) after exposure to the light.

4. Mycobacterium scrofluaceum infects cows, buffalos and suis, produce pigment (yellow or orange color) in dark.

5. Mycobacterium avium subspavium infects poultry birds and human causing avian tuberculosis, non- pigment producing.

6. Mycobacterium avium subsp paratuberculosis infects cows, sheep and goat causing paratuberculosis (john's disease), non- pigment producing

7. Mycobacterium lapraemurium infects cats and rots causing leprosy disease in cats and rots

8. Mycobacterium leprae infects human causing leprosy disease.

Morphology & Staining :-

1) G+ve, straight or curved bacilli, single in arrangement, small groups or bundles. Takes red color (carbol fuchsin) when using acid fast bacilli (AFB) or Zeil-nelsen stain.
2) Non-motile and non-spore forming.

Cultural characteristics :-

1- aerobic bacteria
2- grows on special solid culture media, these media are divided into two major types :-

1- egg based media :-

- Lowenstein-Jensen mediumwhich contains glycerol that stimulates the growth of Mycobacterium tuberculosis and inhibit the growth of Mycobacterium bovis also it contains malachite green which inhibits the growth of contaminants .

- Stone brinks medium :- this medium does not contain glycerol but contains sodium pyruvate which stimulate growth of Mycobacterium bovis also it contains malachite green which inhibits the growth of contaminants .
- Dorset egg medium:- this medium does not contain glycerol but contains crystal violet that stimulate the growth of Mycobacterium tuberculosis and Mycobacterium bovis

note* addition of antibiotics to all the solid culture media of mycoplasma like : cycloheximide, lincomycin and nalidixic acid increase the growth of mycobacterium and inhibit contamination.

2-agar based media :-
1) middle brook's 7H10 agar

note*/the growth of Mycobacterium tuberculosis and Mycobacterium bovis is aerobic at 37-38C° for 10-14 days on the Lowenstein-Jensen medium or stone brinks medium while Mycobacterium avium subspavium grows at 40-34C° for one week

Biochemical tests

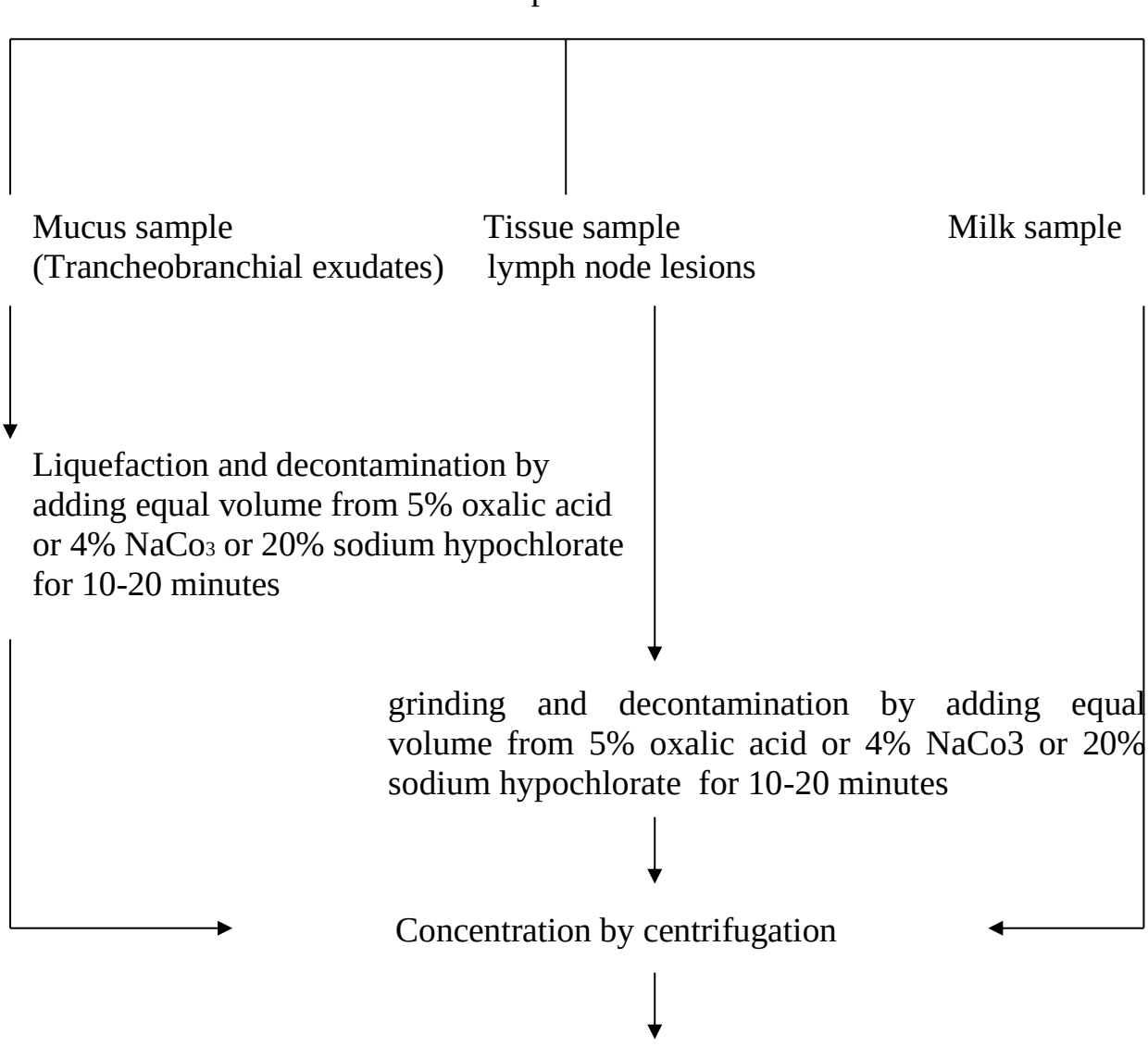
species	Inhibition by glycerol	Nitrate reduction	Niacin production	Tween 80 hydrolysis	Urease test
Mycobacterium tuberculosis	-	+	+	-	+
Mycobacterium bovis	+	-	-	-	+
Mycobacterium avium subspavium	-	-	-	-	-

Diagnosis :-

1- direct examination

a- making smear from specimens (sputum, milk, urine, feaces, uterine discharge and plura fluid) and staining with acid fast stain or zeihl –Nelseen dye

2- biochemical isolation:-



Pasteurella and Mannheimia

Species :

Pasteurella multocida

P. pneumotropica

P. anatipestifer

P. canis

mannheimia or Pasteurella haemolytica

morphology and staining :-

1- gram positive 2- rods or coccobacilli 3- single arrangement or arraneged in pairs or in small groups 4- non-motile 5- non-spore forming
6- bi-polar staining in smears from lesions using the Gimsa stain or methylene blue stain.

Cultural characteristics:-

1) aerobic or facultative anaerobic
2) blood agar : all pasteurella serotypes are non-hemolytic except P. pneumotropica and mannheimia aemolytica which are β-hemolytic.
3) MacConkey's agar : all pasteurella serotypes don't grow on macConkey agar except mannheimia aemolytica which grows as small pink colonies.

Biochemical tests :-

Species	B-hemolysis	MacConkey's agar	Indole	Urease	H_2S production
P. multocida	-	-	+	-	+
P. anatipestifer	-	-	-	-	-
P. neumotropica	+	-	+	+	+
mannheimia haemolytica	+	+	-	-	-

Diagnosis :-

1- Isolation of bacteria, cases history, biochemical and serological tests.
2- Tissues or blood smears stained by methylene blue or Gimsa to see the bi-polar staining organisms
3- Pathogenesity tests on mice or rabbit.