PROGRAM Standard Operating Procedure – Laboratory Services	
Title: MIC53500 – CAMP/Reverse CAMP Test	Policy Number:
Program Name: Laboratory Services	
Applicable Domain: Lab, DI and Pharmacy Services	
Additional Domain(s):	
Effective Date:	Effective Date:
Issuing Authority: Director, Health Services	Date Approved:
Accreditation Canada Applicable Standard: N/A	

GUIDING PRINCIPLE:
The CAMP test is used in the identification of *Streptococcus agalactiae* and many Gram-positive rods, including *Listeria monocytogenes*. The reverse CAMP test is used for the identification of *Arcanobacterium haemolyticum*.

PURPOSE/RATIONALE:
This standard operating procedure describes how to perform the CAMP/Reverse CAMP test.

SCOPE/APPLICABILITY:
This procedure applies to Medical Laboratory Technologists (MLTs) performing the CAMP/Reverse CAMP test.

SAMPLE INFORMATION:

Type	One, well isolated colony

REAGENTS and/or MEDIA:
- Blood agar (BA)

SUPPLIES:
- QC organism *Staphylococcus aureus* ATCC 25923
- QC organism *Streptococcus agalactiae* ATCC 12386
- QC organism *Streptococcus pyogenes* ATCC 19615
- Disposable loops

EQUIPMENT:
- 35° ambient air and 37° CO_2 incubators

SPECIAL SAFETY PRECAUTIONS:

Containment Level 2 facilities, equipment, and operational practices for work involving infectious or potential infectious materials or cultures.

- Ensure that appropriate hand hygiene practices be used.
- Lab gown must be worn when performing activities with potential pathogens.
- Gloves must be worn when direct skin contact with infected materials is unavoidable.
- Eye protection must be used when there is a known or potential risk of exposure of splashes.
- All procedures that may produce aerosols or involve high concentrations or large volumes should be conducted in a biological safety cabinet (BSC).
- The use of needles, syringes and other sharp objects should be strictly limited.

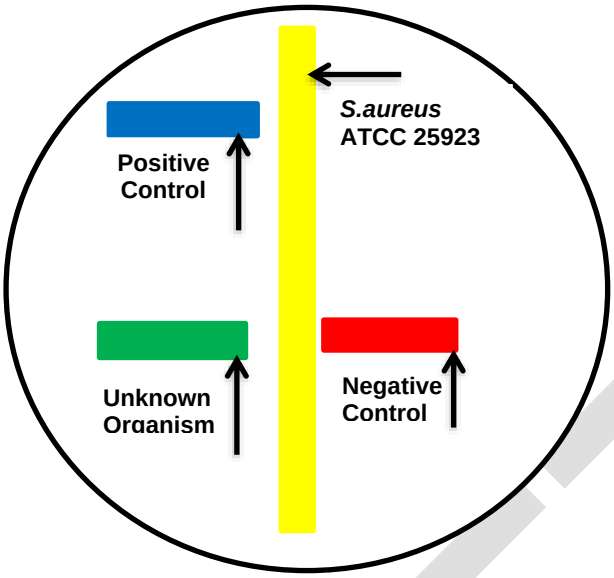
All patient specimens are assumed to be potentially infectious. Routine Practices must be followed. Since viable micro-organisms are used, all cultures must be handled with appropriate precautions. All equipment in contact with cultures should be decontaminated by appropriate methods.

QUALITY CONTROL:

- Quality control performed as tested:
  - Positive: *Streptococcus agalactiae* ATCC 12386
  - Negative: *Streptococcus pyogenes* ATCC 19615
- A TQC order is automatically generated when test is ordered to record the QC results

PROCEDURE INSTRUCTIONS:

Step	Action
Performing the CAMP test	
1	Streak *Staphylococcus aureus* ATCC 25923 in a straight line across the center of a Blood agar plate.
2	Streak the unknown organism in the same manner perpendicular to but NOT touching the *Staphylococcus* streak.
3	Streak the positive control organism parallel to and approximately 2.5 cm from the unknown organism.
4	Streak the negative control organism in the same way on the opposite side of the *Staphylococcus* streak.
5	Label the identification of each streak on the back of the agar plate.
6	Incubate the plate overnight at 35° in the CO_2 incubator. **NOTE:** Refrigeration may enhance the reaction after incubation.



INTERPRETATION OF RESULTS:

IF	THEN
Distinct arrowhead of hemolysis at the intersection of the *Staphylococcus*	**CAMP Test = Positive**
No enhanced hemolysis at the intersection of the *Staphylococcus*	**CAMP Test = Negative**
Distinct arrow of no hemolysis at the intersection of the two haemolytic organisms	**Reverse CAMP Test = Positive**

PROCEDURE NOTES:

Gram-positive bacilli that are CAMP test positive:

- *Rhodococcus equi*
- *Listeria monocytogenes*
- *Proprionebacterium avidum/granulosum*
- *Actinomyces neuii*
- *Turicella otitidis*
- *Corynebacterium glucuronolyticum*
- *Corynebacterium colyeae*
- *Corynebacterium imitans*
- Some strains of *Corynebacterium striatum* and *Corynebacterium afermentans* group

Organisms that are reverse CAMP test positive:

- *Corynebacterium pseudotuberculosis*
- *Corynebacterium ulcerans*
- *Arcanobacterium haemolyticum*
- *Clostridium perfringens*

LIMITATIONS:

1. The test is 98% sensitive in detecting *Streptococcus agalactiae*. Isolates with a negative CAMP test may still be *Streptococcus agalactiae* and require further testing.
2. Increased nonspecific hemolysis at the intersections (a *matchstick* effect) may be seen with other Streptococci, but only *Streptococcus agalactiae* produces a definite arrowhead.
3. *Streptococcus pyogenes* can give a reaction that may be interpreted as positive, but it is PYR positive.
4. The CAMP Test separates *Listeria monocytogenes* from most other *Listeria* species.
5. If the agar is too thin or hemolysed, the reaction may be very weak.

REFERENCES:

1. Clinical Microbiology Procedures Handbook, 4th edition, ASM Press, 2016

APPROVAL:

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Date

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REVISION HISTORY:

REVISION	DATE	Description of Change	REQUESTED BY
1.0	05 Apr 19	Initial Release	L. Steven
2.0	30 Jun 21	Procedure reviewed and added to NTHSSA policy template	L. Steven