




CULTURE AND
ANTIBIOTIC
SENSITIVITY TEST
IN PRODIA
LABORATORY,
DENPASAR BALI,
JUNE 1ST 2007 –
DECEMBER 31st, 2007

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Objective

1. To find out what kind of organism in cultures
2. To monitor organism response to antimicrobial drug
3. To find out what kind of medicine will work best to eradicate a cultured organism
4. To compare the sensitive drugs in this research with the literatures

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Benefit

As a starting point, to provide antibiotics guideline to treat infectious diseases in hospitals and other health care providers in Denpasar. Therefore, the number of successful infectious diseases treatments will be higher.

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METHOD

- Blood Specimen
- Urine Specimen
- Other Body Fluid Specimen

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- **STEP I: Isolating and Nurturing Bacteria**
Medium : Bactec Plus
The Test Period: 4 days
- **STEP II: Culturing and Incubating Bacteria**
Medium : Mac Conkey dan *Blood Agar*
The Test Period: 24 hours
- **STEP III: Bacteria Identification**
Media:
Fire Reagent (to identify the group of stem bacteria)
Catalase & Coagulase (to identify gram (+) coccus Bacteria)
Serological test (to determine sub type of Salmonella and *E. coli*)
The Test Period: 24 hours
- **STEP IV :Sensitivity Test**
Medium : MULLER HINTON
The Test Period: 24 jam

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- **STEP I: Isolating and Nurturing Bacteria**
Medium :
Use Gram Coloring to confirm whether the bacteria growth or not
The test period: Day 0 (zero)
- **STEP II: Culturing and Incubating Bacteria**
Medium : *Chrom Agar*
The test period : 1 st Day (24 hours)
- **STEP III: Bacteria Identification**
Media:
Fire Reagent (to identify the group of stem bacteria)
Catalase & Coagulase (to identify gram (+) coccus Bacteria)
Serological test (to determine sub type of Salmonella and *E. coli*)
The test period : 2nd day (24 hours)
- **STEP IV :Sensitivity Test**
Medium : MULLER HINTON
The test period : 3rd day (24 hours)

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- **STEP I: Isolating and Nurturing Bacteria**
Medium : Broth Heart Infusion (BHI)
The test period : 1st day (24 hours)
- **STEP II: Culturing and Incubating Bacteria**
Media :
 - Feces
 - Chrom Agar Salmonella
 - Mac Conkey Agar (Stem Gram negative)
 - Other Body Fluid
 - Blood Agar (Coccus gram positive)
 - Mac Conkey Agar (Stem Gram negative)The test period : 2nd day (24 hours)
- **STEP III: Bacteria Identification**
Media:
 - Fire Reagent (to identify the group of stem bacteria)
 - Catalase & Coagulase (to identify gram (+) coccus Bacteria)
 - Serological test (to determine sub type of Salmonella and *E. coli*)The test period : 3rd day (24 hours)
- **STEP IV :Sensitivity Test**
Medium : MULLER HINTON
The test period : 4th day (24 hours)

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SPECIMEN							
NO	SPECIMEN	NUMBER	%	NO	SPECIMEN	NUMBER	%
1	Pus	87	29,39%	14	Pharyngeal swab	2	0,68%
2	Sputum	51	17,23%	15	Pleural effusion	1	0,34%
3	Urine	45	15,20%	16	Joint fluid	1	0,34%
4	Blood	24	8,11%	17	Feces	1	0,34%
5	Vagina swab	23	7,77%	18	Palatum swab	1	0,34%
6	Throat swab	17	5,74%	19	Skin Ulcer secretion	1	0,34%
7	Vagina secretion	15	5,07%	20	Eye secretion	1	0,34%
8	Bronchial secretion	6	2,03%	21	Cervix secretion	1	0,34%
9	Eye swab	5	1,69%	22	Skin swab	1	0,34%
10	Sperm	3	1,01%	23	Rectal swab	1	0,34%
11	Urethral swab	3	1,01%	24	Tonsil swab	1	0,34%
12	Body fluid	2	0,68%	25	Urethral secretion	1	0,34%
13	Nose swab	2	0,68%	TOTAL		296	100%

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N O	BACTERIA FINDINGS	NUMBER	N O	BACTERIA FINDINGS	NUMBER
1	<i>Escherichia coli</i>	46	11	<i>Proteus mirabilis</i>	8
2	<i>Staphylococcus aureus</i>	45	12	<i>Enterobacter cloacae</i>	6
3	<i>Staphylococcus epidermidis</i>	37	13	<i>Streptococcus pyogenes</i>	3
4	<i>Klebsiella pneu. ssp pneumoniae</i>	31	14	<i>Klebsiella oxytoca</i>	2
5	<i>Staphylococcus saprophyticus</i>	28	15	<i>Citrobacter freundii</i>	1
6	<i>Pseudomonas aeruginosa</i>	25	16	<i>Enterobacter sp</i>	1
7	<i>Enterobacter aerogenes</i>	20	17	<i>Salmonella typhi</i>	1
8	<i>Enterobacter sakazakii</i>	20	18	<i>Serratia liquefacins</i>	1
9	<i>Streptococcus viridans</i>	11	19	<i>Staphylococcus viridans</i>	1
10	<i>Serratia marcescens</i>	9	TOTAL		296




THE BIGGEST BACTERIA FINDINGS FOR EACH SPECIMEN

- I. Pus (87 Specimens)
 - *Staphylococcus aureus* : 19 (22%)
- II. Sputum (51 Specimens)
 - *Staphylococcus aureus* :10(20%)
- III. Urine (45 Specimens)
 - *Escherichia coli* : 20 (44%)
- IV. Blood (24 Specimens)
 - *Staphylococcus epidermidis* : 9 (38%)

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THE BIGGEST BACTERIA FINDINGS FOR EACH SPECIMEN

- V. Vagina Swab (23 Specimens)
 - *Staphylococcus epidermidis* : 6 (26%)
- VI. Throat Swab (17 Specimens)
 - *Staphylococcus saprophyticus*: 5 (29%)
- VI. Vagina Secretion (15 Specimens)
 - *Escherichia coli* : 4 (27%)
- VI. Bronchus Fluid (6 Specimens)
 - *Klebsiella pneu. ssp pneumoniae* :3 (50%)


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THE BIGGEST BACTERIA FINDINGS FOR EACH SPECIMEN

- IX. Ear Swab (5 Specimens)
 - *Staphylococcus aureus* : 2 (40%)
- X. Sperm (3 Specimens)
 - *Staphylococcus aureus* : 1 (33,3%)
 - *Staphylococcus epidermidis* : 1 (33,3%)
 - *Enterobacter sakazakii* : 1 (33,3%)
- XI. UrethraL Swab (3 Specimens)
 - *Staphylococcus saprophyticus* : 1 (33,3%)
 - *Enterobacter aerogenes* : 1 (33,3%)
 - *Staphylococcus epidermidis* : 1 (33,3%)
- XII. Body Fluid (2 Specimens)
 - *Pseudomonas aeruginosa* : 2 (100%)

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THE BIGGEST BACTERIA FINDINGS FOR EACH SPECIMEN

- XIII. Nose Swab (2 Specimens)
 - *Klebsiella pneu. ssp pneumoniae* : 1 (50%)
 - *Staphylococcus epidermidis* : 1 (50%)
- XIV. Pharyngeal swab (2 Specimens)
 - *Staphylococcus saprophyticus* : 1 (50%)
 - *Streptococcus viridans* : 1 (50%)
- XV. Pleura effusion (1 Specimen)
 - *Staphylococcus epidermidis* : 1 (100%)
- XVI. Joint fluid (1 Specimen)
 - *Pseudomonas aeruginosa* : 1 (100%)
- XVII. Feces (1 Specimen)
 - *Escherichia coli* : 1 (100%)

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THE BIGGEST BACTERIA FINDINGS FOR EACH SPECIMEN

- XVIII. Palatum Swab (1 Specimen)
 - *Staphylococcus epidermidis* : 1 (100%)
- XIX. Eye Secretion (1 Specimen)
 - *Staphylococcus epidermidis* : 1 (100%)
- XX. Cervix Secretion (1 Specimen)
 - *Pseudomonas aeruginosa* : 1 (100%)
- XXI. Skin Swab (1 Specimen)
 - *Serratia marcescens* : 1 (100%)
- XXII. Rectal Swab (1 Specimen)
 - *Escherichia coli* : 1 (100%)
- XXIII. Tonsil Swab (1 Specimen)
 - *Staphylococcus saprophyticus* : 1 (100%)
- XXIV. Urethral Secretion (1 Specimen)
 - *Staphylococcus epidermidis* : 1 (100%)
- XXV. Skin Ulcer Secretion (1 Specimen)
 - *Staphylococcus aureus* : 1 (100%)

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BACTERIA	THE SENSITIVE ANTIBIOTICS	
	Research Result	Literature
Gram Negative Bacteria		
1 <i>Citrobacter freundii</i>	<u>Meropenem</u>	Amikacin, Cefepime, Cefpirome, Ceftazidime, Cefotetan, Cefotaxime, Ciprofloxacin, Cloramphenicol, Gentamicin, Gatifloxacin, <u>Meropenem</u> , Norfloxacin, Piperacillin Tazobactam, Sulfamethoxazole Trimethoprim, Vancomycin ²
2 <i>Enterobacter sp</i>	<u>Meropenem</u>	<i>Antibiotika yang sensitif untuk Enterobacter sp:</i>
3 <i>Enterobacter aerogenes</i>	<u>Amikacin</u> , Ciprofloxacin, <u>Gentamicin</u> , <u>Meropenem</u> , <u>Sulfamethoxazole – Trimethoprim</u> , Sulfferazon, <u>Tobramycin</u> .	<u>Aminoglikoside</u> , Cefepime, Fluoroquinolon, <u>Meropenem</u> , Sulfamethoxazole Trimethoprim, ¹
4 <i>Enterobacter cloacae</i>	<u>Amikacin</u> , <u>Gentamicin</u> , <u>Meropenem</u> .	
5 <i>Enterobacter sakazakii</i>	<u>Amikacin</u> , <u>Gentamicin</u> , <u>Meropenem</u> , Sulferazon	

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BACTERIA		THE SENSITIVE ANTIBIOTICS	
		Research Result	Literature
Gram Negative Bacteria			
6	<i>Escherichia coli</i>	<u>Amikacin</u> , Ciprofloxacin, <u>Gentamicin</u> , <u>Meropenem</u> , Sulferazon,	<u>Aminoglikoside</u> , Cefotaxime, Ceftriaxone, Fluoroquinolone, Fosfomycine, <u>Meropenem</u> , Nitrofurantoin, Sulfamethoxazole Trimethoprim, ¹
7	<i>Klebsiella oxytoca</i>	<u>Amikacin</u> , Ciprofloxacin, <u>Meropenem</u> , Sulferazon, Tetracycline Tobramycin,	<i>Antibiotika yang sensitif untuk Klebsiella sp:</i> Amoxicillin, <u>Amikacin</u> , Aztreonam, Chloramphenicol, Cephalexin, Cephalotin, Cefaclor, Cefuroxime, Cefotaxime, Cefepime, Cefpirome, Ceftazidime, Ciprofloxacin, Gentamicin, Gatifloxacin <u>Meropenem</u> , Norfloxacin, Piperacillin Tazobactam, Sulfamethoxazole Trimethoprim , Vancomycin ²
8	<i>Klebsiella pneu.ssp. pneumoniae</i>	<u>Amikacin</u> , Chloramphenicol, Gentamicin, <u>Meropenem</u> , Sulferazon,	

BACTERIA		THE SENSITIVE ANTIBIOTICS	
		Research Result	Literature
Gram Negative Bacteria			
9	<i>Proteus mirabilis</i>	<u>Amikacin</u> , Amoxicillin Clavulanic Acid, <u>Amoxicillin</u> , Ciprofloxacin, Cefaclor, Cefotaxime, Gentamicin, <u>Meropenem</u> , <u>Piperacillin-Tazobactam</u> , <u>Sulfamethoxazole-Trimethoprim</u> , Sulferazon, Tobramycin.	<u>Amoxicillin</u> , <u>Amikacin</u> Aztreonam, Chloramphenicol, Ciprofloxacin, Cephalexin, Cephalotin, Cefaclor, Cefuroxime, Cefotaxime, Cefepime, Cefpirome, Ceftazidime, Gentamicin, Gatifloxacin, <u>Meropenem</u> , Norfloxacin, <u>Piperacillin Tazobactam</u> , <u>Sulfamethoxazole Trimethoprim</u> , Vancomycin ²
10	<i>Pseudomonas aeruginosa</i>	<u>Amikacin</u> , Cefepime, Ceftazidime, <u>Ciprofloxacin</u> , Gentamicin, Levofloxacin, <u>Meropenem</u> , <u>Piperacillin Tazobactam</u> , Tobramycin, Sulferazon	<u>Amikacin</u> , Cefpirome, <u>Cefepime</u> , Ceftazidime, Cefotetan, <u>Ciprofloxacin</u> , <u>Gentamicin</u> , Gatifloxacin, <u>Meropenem</u> , <u>Piperacillin Tazobactam</u> , ²

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BACTERI		THE SENSITIVE ANTIBIOTICS	
		Research Result	Literature
Gram Negative Bacteria			
11	<i>Salmonella typhi</i>	Amikacin, Cefotaxime, <u>Chloramphenicol</u> , <u>Ciprofloxacin</u> , Gentamicin, <u>Meropenem</u> , Piperacilin Tazobactam Sulferazon, <u>Sulfamethoxazole</u> <u>Trimethoprim</u> , Tobramycin,	Ceftriaxone, <u>Ciprofloxacin</u> , <u>Chloramphenicol</u> , Ofloxacin, <u>Sulfamethoxazole</u> <u>Trimethoprim</u> ³
12	<i>Serratia liquefacins</i>	<u>Amikacin</u> , Cefotaxime, <u>Ciprofloxacin</u> , <u>Gentamycin</u> , <u>Meropenem</u> , <u>Piperacillin</u> <u>Tazobactam</u> , Sulferazon	<i>Antibiotika yang sensitif untuk Serratia sp:</i> Amoxicillin, <u>Amikacin</u> Aztreonam, Cefepime, Cefpirome, Ceftazidime, Cefotetan, <u>Ciprofloxacin</u> , Gatifloxacin, Gentamicin, <u>Meropenem</u> , <u>Piperacillin</u> <u>Tazobactam</u> , Sulfamethoxazole Trimethoprim, Vancomycin ²
13	<i>Serratia marcescens</i>	<u>Amikacin</u> , Ciprofloxacin Gentamicin, <u>Meropenem</u> , Sulferazon, <u>Sulfamethoxazole</u> <u>Trimethoprim</u> , Tobramycin,	

BACTERIA		THE SENSITIVE ANTIBIOTICS	
		Research Result	Literature
Gram Positive Bacteria			
14	<i>Staphylococcus aureus</i>	Chloramphenicol, Doxycycline, Gentamicin, <u>Linezolid</u> , <u>Meropenem</u> , <u>Penicillin</u> , <u>Sulfamethoxazole-Trimethoprim</u> , Sulferazon,	Cephalosporin, Clindamycin, Daptomycin, Doxycycline, Fluoroquinolone, Gentamicin, <u>Linezolid</u> , Minocycline <u>Penicillin</u> , <u>Sulfamethoxazole</u> <u>Trimethoprim</u> , Vancomycin ¹
15	<i>Staphylococcus epidermidis</i>	Doxycycline, Gentamicin, Linezolid, <u>Meropenem</u> , Sulferazon, Sulfamethoxazole-Trimethoprim, Vancomycin	-
16	<i>Staphylococcus saprophyticus</i>	Chloramphenicol, Gentamicin, Linezolid, <u>Meropenem</u> , , Sulferazon	-

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BACTERIA		THE SENSITIVE ANTIBIOTICS	
		Research Result	Literature
Gram Positive Bacteria			
17	<i>Staphylococcus viridans</i>	Ampicillin, Azithromycin, Cefepime, Cefotaxime, Clarithromycin, Chloramphenicol, Clindamycin, Doxycycline, Erythromycin, Gatifloxacin, Linezolid, Penicillin, Piperacillin, Tazobactam, Sulferazon, Tetracycline, Vancomycin.	-
18	<i>Streptococcus pyogenes</i>	Azithromycin, Cefotaxime, <u>Chloramphenicol</u> , <u>Clindamycin</u> , Doxycycline, <u>Erythromycin</u> , Gatifloxacin, Levofloxacin, <u>Linezolid</u> , Ofloxacin, <u>Piperacillin</u> , <u>Tazobactam</u> , Sulferazon, <u>Vancomycin</u> .	Ampicillin, Amoxicillin, Azithromycin, <u>Chloramphenicol</u> , <u>Clindamycin</u> , Clavulanic Acid, Cephalexin, Cephalotin, Cefaclor, Cefuroxime, Cefotaxime, Cefepime, Cefpirome, Ceftazidime, Clarithromycin, Doxycycline, <u>Erythromycin</u> , Fusidate Na, Gatifloxacin, <u>Linezolid</u> , Metronidazole, Meropenem, Penicillin, Piperacillin, <u>Piperacillin</u> , <u>Tazobactam</u> , Sulfamethoxazole, Trimethoprim, <u>Vancomycin</u> ²


BACTERIA		THE SENSITIVE ANTIBIOTICS	
		Research Result	Literature
Gram Positive Bacteria			
19	<i>Streptococcus viridans</i>	Ampicillin, <u>Cefotaxime</u> , <u>Cefepime</u> , Azithromycin, Clarithromycin, Chloramphenicol, Clindamycin, Doxycycline, Erythromycin, Gatifloxacin, Levofloxacin, Linezolid, Ofloxacin, Penicillin, Tazobactam, Sulfamethoxazole-Trimethoprim, Sulferazon, Tetracycline, Vancomycin.	<u>Cephalosporin</u> , Penicillin ± Gentamicin, Vancomycin ¹



Conclusion

1. There are **some similarities** of the antibiotic choices to kill bacteria **both based on research result and literatures**. **But some** of the sensitive antibiotics to eradicate bacteria **are different**. These facts will affect in choosing the right medicine to treat infectious diseases.
2. **All** the gram positive and negative bacteria are **sensitive to meropenem**, **but** some gram positive bacteria : *Staphylococcus viridans*, *Streptococcus pyogenes*, and *Streptococcus viridans* are **resistant to meropenem**. These three bacteria are sensitive to cheap antibiotics such as Chloramphenicol, Doxycycline, Erythromycin.

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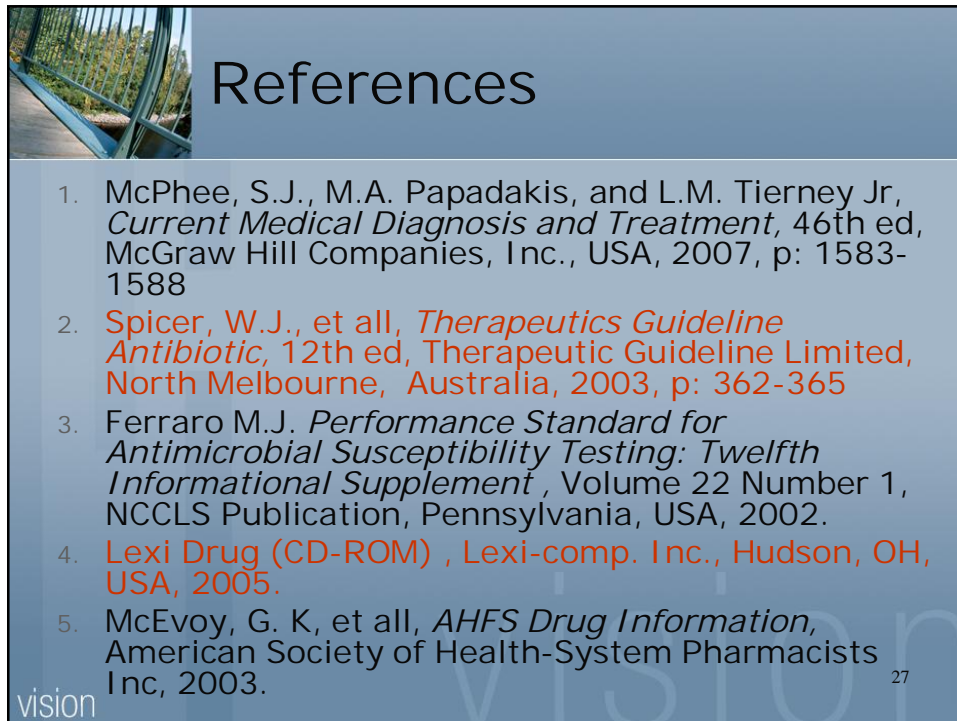


Suggestion

1. **Continuing research to update the data**
2. **Collaborating with many health care providers in Denpasar, Bali, and Indonesia to get the data which representing Culture and Sensitivity test in these areas**

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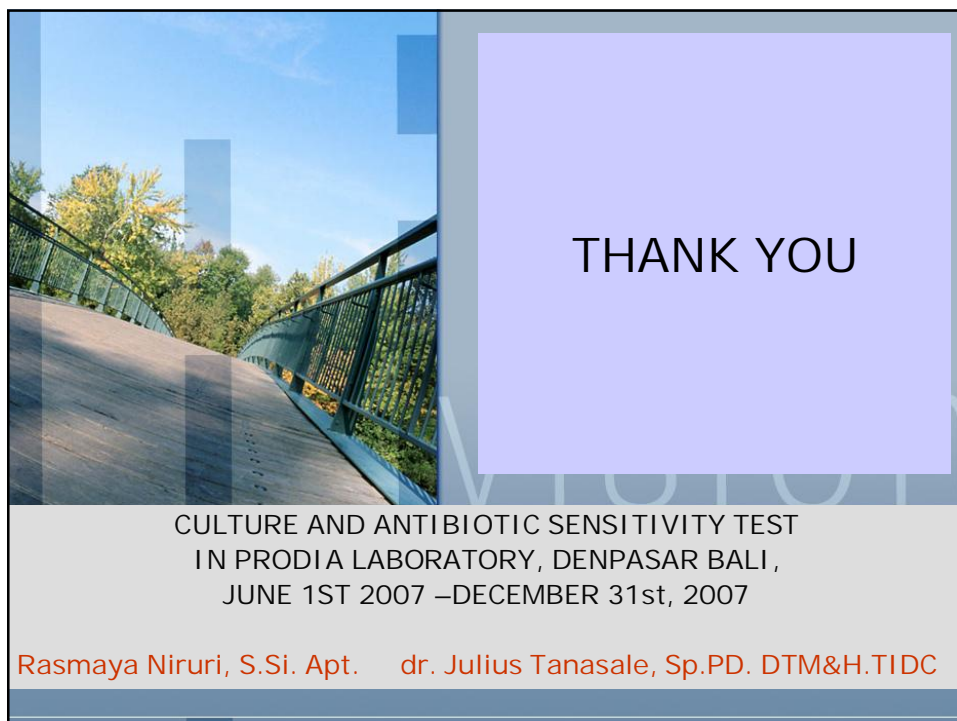
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THANK YOU

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