HealthLink Inc. Universal Transport Medium (UTM) System

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INTENDED USE

HealthLink Inc. Universal Transport Medium (UTM) System is intended for the collection and transport of clinical specimens containing viruses, chlamydia, mycoplasma or ureaplasma from the collection site to the testing laboratory. UTM can be processed using standard clinical laboratory operating procedures for viral, chlamydial, mycoplasma and ureaplasma culture.

SUMMARY AND EXPLANATION

One of the routine procedures in the diagnosis of infections caused by viruses, chlamydia, mycoplasma or ureaplasma involves the collection and safe transportation of biological samples. This can be accomplished using the HealthLink Inc. Universal Transport Medium (UTM) System. HealthLink Inc. UTM System includes a universal transporting medium that is room temperature stable, which can sustain viability (and infectivity) of a plurality of organisms that include clinically important viruses, chlamydia, mycoplasma and ureaplasma during transit to the testing laboratory. The formulation of UTM medium includes protein for stabilization, antibiotics to minimize bacterial and fungal contamination, and a buffer to maintain a neutral pH.

HealthLink Inc. UTM System medium is provided in labeled screw-cap tubes designed for transport of the clinical sample. HealthLink Inc. UTM System is also supplied as a sample collection kit that comprises a package which contains one screw-cap tube of UTM medium and a peel pouch incorporating one or two sterile specimen collection swabs. A range of UTM sample collection kits are available which incorporate different types of shaft swabs which facilitate the collection of specimens from different sites of the patient as described below in the Directions for Use section.

Once a swab sample is collected it should be placed immediately into the transport tube where it comes into contact with transport medium. Swab specimens for virus, chlamydia, mycoplasma and ureaplasma isolation should be submitted to the laboratory as quickly as possible after collection. Although HealthLink Inc. UTM medium can maintain even fragile organisms for long periods of time at room temperature, it is recommended that specimens be refrigerated at 2-8°C or kept on wet ice following collection and while in transit. If there will be a long delay before processing, specimens should be frozen at -70°C or colder and transported on dry ice. Storage at -20• C is less satisfactory than storage at 4• C or -70• C and can result in the loss of infectivity.

PRINCIPLE

HealthLink Inc. UTM medium consists of modified Hank's balanced salt solution supplemented with bovine serum albumin, cysteine, gelatin, sucrose, and glutamic acid. The pH is buffered with HEPES buffer. Phenol red is used to indicate pH. Vancomycin, amphotericin B, and colistin are incorporated in the medium to inhibit growth of competing bacteria and yeast. The medium is isotonic and non-toxic to mammalian host cells. The presence of sucrose acts as a cryoprotectant which aids in the preservation of viruses and chlamydia if specimens are frozen (-70°C) for prolonged storage.

UTM MEDIUM FORMULATION

Hank's Balanced Salts
Bovine Serum Albumin
L-Cysteine
Gelatin
Sucrose
L-Glutamic Acid
HEPES Buffer
Vancomycin
Amphotericin B
Colistin
Phenol Red
pH 7.3 +/- 0.2 @ 25°C

46A - Rev. 0809

PRECAUTIONS

- This product is *For In* Vitro *Diagnostic Use* .
- Observe approved biohazard precautions and aseptic techniques. To be used only by adequately trained and qualified personnel.

- All specimens and materials used to process them should be considered potentially infectious and handled in a manner which prevents infection of laboratory personnel. Sterilize all biohazard waste including specimens, containers and media after their use.
- Directions should be read and followed carefully.

STORAGE

This product is ready for use and no further preparation is necessary. The product should be stored in its original container at
2-25°C until used. Do not overheat. Do not incubate, or freeze prior to use. Improper storage will result in a loss of efficacy.
Do not use after expiration date, which is clearly printed on the outer box and on each individual sterile pouch unit and the specimen transport tube label.

PRODUCT DETERIORATION

HealthLink Inc. UTM should not be used if (1) there is evidence of damage or contamination to the product, (2) there is evidence of leakage, (3) the color of the medium has changed from light orange-red, (4) the expiration date has passed, (5) the swab pouch is open, or (6) there are other signs of deterioration.

SPECIMEN COLLECTION, STORAGE AND TRANSPORTATION

Specimens for virus, chlamydia, mycoplasma or ureaplasma investigation should be collected and handled following published manuals and guidelines.[2,3,4,7,9,10,11] To maintain optimum viability, transport the specimen to the laboratory as soon as possible. Best recovery is obtained when specimens are refrigerated at 2-8°C or kept on wet ice following collection and while in transit. If there will be a long delay before processing, specimens should be frozen at -70°C or colder and transported on dry ice. Specific requirements for the shipment and handling of specimens should be in full compliance with state and federal regulations[8,11,12]. Shipping of specimens within medical institutions should comply with internal guidelines of the institution. All specimens should be processed as soon as they are received in the laboratory.

MATERIALS SUPPLIED

HealthLink Inc. UTM System includes a screw-cap tube containing 1.5ml, 3ml or 10ml of transport medium plus three 3mm size glass beads. UTM System tubes of transport medium are supplied alone or in a kit format with one of the following six specimen collection swab options:
One regular size plastic shaft swab with polyester fiber tip
Two regular size plastic shaft swabs with polyester fiber tips
One regular size plastic shaft swab and one Minitip plastic shaft swab pre-scored for easy breakage, both with polyester fiber tips
One Minitip plastic shaft swab with polyester fiber tip pre-scored for easy breakage
One Combo stainless steel wire-plastic shaft Minitip swab with polyester fiber tip
One regular size plastic shaft swab and one Combo stainless steel wire-plastic shaft Minitip swab, both with polyester fiber tips

These different swab applicator shafts facilitate the collection of specimens from various sites on a patient.
Refer to the individual product descriptions for specific information about materials supplied.

MATERIALS REQUIRED BUT NOT SUPPLIED

Appropriate materials for isolating, differentiating and culturing viruses, chlamydia, mycoplasma and ureaplasma. These materials include tissue culture cell lines, tissue culture medium, incubation systems and reading equipment. Refer to appropriate references for recommended protocols for isolation and identification of viruses, chlamydia, mycoplasma and ureaplasma agents.[2,3,4,7,10]

DIRECTIONS FOR USE

HealthLink Inc. UTM System is available in the product configurations indicated in the table below.

Catalog No.	UTM Medium Tubes Description	Pack Size	Sampling Sites*
330C.HL	3ml of UTM medium in 10 ml size screw-cap tube with internal shaped conical bottom. Each tube contains three 3mm glass beads.	6 x 50 tubes	Vesicle aspirates, corneal or conjunctival scrapings, small pieces of tissue or stool samples

331C.HL	10ml of UTM medium in 30ml size screw-cap tube with internal shaped conical bottom. Each tube contains three 3mm glass beads.		5 x 50 tubes	Vesicle aspirates, corneal or conjunctival scrapings, small pieces of tissue or stool samples
Catalog No.	UTM Collection Kit Description		Pack Size	Sampling Sites*
	TUBE	SWAB		
302C.HL	3ml of UTM medium in 10 ml size screw-cap tube with internal shaped conical bottom. Each tube contains three 3mm glass beads.	two sterile wrapped regular size plastic shaft polyester applicator swabs	6 x 50 kits	Throat, cervical, vulvar, rectal and nasal, dermal, mucosal, and genital lesions
303C.HL	3ml of UTM medium in 10 ml size screw-cap tube with internal shaped conical bottom. Each tube contains three 3mm glass beads.	one sterile wrapped regular size plastic shaft polyester applicator swab and one Minitip plastic shaft polyester applicator swab pre-scored for easy breakage	6 x 50 kits	Throat, cervical, vulvar, rectal and nasal, dermal, mucosal, and genital lesions; eye/conjunctival, nasopharyngeal, urethral
328C.HL	3ml of UTM medium in 10 ml size screw-cap tube with internal shaped conical bottom. Each tube contains three 3mm glass beads.	one sterile wrapped regular size plastic shaft polyester applicator swab	6 x 50 kits	Throat, cervical, vulvar, rectal and nasal, dermal, mucosal, and genital lesions
329C.HL	3ml of UTM medium in 10 ml size screw-cap tube with internal shaped conical bottom. Each tube contains three 3mm glass beads.	one sterile wrapped Minitip plastic shaft polyester applicator swab pre-scored for easy breakage	6 x 50 kits	Eye/conjunctival, nasopharyngeal, urethral
339C.HL	3ml of UTM medium in 10 ml size screw-cap tube with internal shaped conical bottom. Each tube contains three 3mm glass beads.	one sterile wrapped Combo wire plastic shaft Minitip polyester applicator swab	6 x 50 kits	Eye/conjunctival, nasopharyngeal, urethral
340C.HL	3ml of UTM medium in 10 ml size screw-cap tube with internal shaped conical bottom. Each tube contains three 3mm glass beads.	one sterile wrapped regular size plastic shaft polyester applicator swab and one Combo wire – plastic shaft Minitip polyester applicator swab	6 x 50 kits	Throat, cervical, vulvar, rectal and nasal, dermal, mucosal, and genital lesions; eye/conjunctival, nasopharyngeal, urethral
343C.HL	1.5ml of UTM medium in 10 ml size screw-cap tube with internal shaped conical bottom. Each tube contains three 3mm glass beads.	two sterile wrapped regular size plastic shaft polyester applicator swabs	6 x 50 kits	Throat, cervical, vulvar, rectal and nasal, dermal, mucosal, and genital lesions

*Performance testing with HealthLink Inc. UTM System was conducted using laboratory strains spiked onto a swab and not using human specimens.

Proper specimen collection from the patient is extremely critical for successful isolation and identification of infectious organisms. For specific guidance regarding specimen collection procedures, consult published reference manuals.[1,2,3,4,7,9,10,11] Specimens should be collected as soon as possible after the clinical onset of disease. Highest viral titers are present during the acute illness.

For UTM Medium Tubes
1. Aseptically remove cap from tube
2. Aseptically place vesicle aspirates, corneal or conjunctival scrapings, small pieces of tissue or stool samples into the tube with UTM medium
3. Replace cap to tube and close tightly
4. Label with appropriate patient information
5. Send to the laboratory for immediate analysis

For UTM Collection Kits
1. Collect specimen with swab
2. Aseptically remove cap from tube
3. Insert swab into the tube with UTM medium
4. Break swab shaft by bending it against the tube wall. For Minitip swabs, break shaft evenly at the pre-scored line.
5. Replace cap to tube and close tightly
6. Label with appropriate patient information
7. Send to the laboratory for immediate analysis

QUALITY CONTROL

All lot numbers of the UTM medium are tested for microbial contamination, toxicity to host cells and the ability to maintain viability of desired agents. Procedures for quality control of UTM transport medium and virus culture media

are described in a number of publications by the American Society for Microbiology[3,7,10] and by NCCLS[5,6]. If aberrant quality control results are noted, patient results should not be reported.

LIMITATIONS

1. Specimens should be handled aseptically.
2. Condition, timing, and volume of specimen collected for culture are significant variables in obtaining reliable culture results. Follow recommended guidelines for specimen collection.[1,2,3,4,7,10]
3. Repeated freezing and thawing of specimens may reduce the recovery of viable organisms.
4. UTM is intended for use as a collection and transport medium for viral, chlamydial, mycoplasma and ureaplasma agents only. This medium can serve as a cryoprotectant for clinical viruses, including *Cytomegalovirus* and *Varicella Zoster Virus*.
5. Because calcium alginate swabs are toxic for many enveloped viruses and may interfere with fluorescent antibody tests, they should not be used for specimen collection. Wooden shaft swabs may contain toxins and formaldehydes and should not be used. Polyester (Dacron) tipped swabs are suitable when specimen collection by a swab is appropriate.
6. UTM kits are intended to be used with the medium tubes and swabs provided in the kit. The use of tubes of medium or swabs from any other source could affect the performance of the product.

WARNINGS

- Do not re-sterilize unused swabs.
- Do not re-pack
- Not suitable to collect and transport microorganisms other than viruses, chlamydia, mycoplasma and ureaplasma
- Not suitable for any other application than intended use
- The use of this product in association with a rapid diagnostic kit or with diagnostic instrumentation should be previously validated by the user
- Do not use if the swab is visibly damaged (i.e., if the swab tip is broken)
- Applicator swab is qualified as Class IIa Medical Device according to European Medical Device Directive 93/42/EEC - Surgically Invasive Transient Use
  Class IIa means swabs can be used for sampling body surfaces, body orifices (e.g., nose, throat and vagina and deep invasive surgical wounds)
- Do not ingest the medium
- To be handled by trained personnel only
- Do not use the UTM medium for premoistening or prewetting the applicator swab prior to collecting the sample or for rinsing or irrigating the sampling sites

RESULTS

Results obtained will largely depend on proper and adequate specimen collection, as well as timely transport and processing in the laboratory.

PERFORMANCE CHARACTERISTICS

Viability studies were performed using HealthLink Inc. UTM with a variety of viruses, chlamydia, mycoplasma and ureaplasma. Swabs accompanying each transport system were directly inoculated in triplicate with 100ml of organismsm suspension. Swabs were then placed in their respective transport medium tubes and were held for 0, 24 and 48 hours at both 4• C and room temperature (20-25• C). At the appropriate time interval, each swab was vortexed, removed from its transport medium tube and then an aliquot of this suspension was inoculated into shell vials or into appropriate culture media. All cultures were processed by standard laboratory culture technique and examined after a specified incubation time. Organism viability was determined by fluorescing foci counts for viruses and chlamydia strains and by CFU counts for mycoplasma and ureaplasma strains.
Organisms evaluated were: *Adenovirus, Cytomegalovirus, Echovirus Type 30, Herpes Simplex Virus Type 1, Herpes Simplex Virus Type 2, Influenza A, Parainfluenza 3, Respiratory Syncytial Virus, Varicella Zoster Virus, Chlamydia pneumoniae, Chlamydia trachomatis, Mycoplasma hominis, Mycoplasma pneumoniae and Ureaplasma urealyticum.*

The results for the strains tested using HealthLink Inc. UTM System are shown in the table below.

HealthLink Inc. UTM System was able to maintain the viability of the following organisms for at least 48 hours at both room temperature (20-25°C) and in the refrigerator (2-8°C) under the test conditions described above: *Adenovirus, Cytomegalovirus, Echovirus Type 30, Herpes Simplex Virus Type 1, Herpes Simplex Virus Type 2, Influenza A, Parainfluenza 3, Respiratory Syncytial Virus, Varicella Zoster Virus, Chlamydia pneumoniae, Chlamydia trachomatis, Mycoplasma hominis, Mycoplasma pneumoniae and Ureaplasma urealyticum.*

Organism	Organism Concentration	Holding Time (hours)	Incubation Time Before Reading (hours)	Viability Challenge at 4°C Foci of infected cells/200 ml[2]	Viability Challenge at RT Foci of infected cells/200 ml[2]
Adenovirus	10^{-1} Neat Virus Stock Suspension* (dilution produces infectivity of 70% of cells)	0 24 48	24 24 24	123 62 68	119 47 63
	10^{-2} Neat Virus Stock Suspension* (dilution produces infectivity of 42% of cells)	0 24 48	24 24 24	17 5 5	14 3 7
Cytomegalovirus	Neat Virus Stock Suspension* (neat produces infectivity of 3% of cells)	0 24 48	24 24 24	337 582 394	444 1012 506
	1:2 Neat Virus Stock Suspension* (dilution produces infectivity of 2% of cells)	0 24 48	24 24 24	49 63 72	195 80 228
Echovirus Type 30	10^{-1} Neat Virus Stock Suspension* (dilution produces infectivity of 64% of cells)	0 24 48	24 24 24	76 59 66	79 75 60
	10^{-2} Neat Virus Stock Suspension* (dilution produces infectivity of 35% of cells)	0 24 48	24 24 24	34 18 25	48 26 20
Herpes Simplex Virus Type 1	10^{-1} Neat Virus Stock Suspension* (dilution produces infectivity of 100% of cells)	0 24 48	24 24 24	491 387 282	412 301 164
	10^{-2} Neat Virus Stock Suspension* (dilution produces infectivity of 100% of cells)	0 24 48	24 24 24	98 68 21	100 10 1
Herpes Simplex Virus Type 2	10^{-1} Neat Virus Stock Suspension* (dilution produces infectivity of 90% of cells)	0 24 48	24 24 24	TNTC[1] 615 525	TNTC[1] 437 58
	10^{-2} Neat Virus Stock Suspension* (dilution produces infectivity of 40% of cells)	0 24 48	24 24 24	228 170 75	315 73 7
Influenza A	Neat Virus Stock Suspension* (neat produces infectivity of 59% of cells)	0 24 48	16 16 16	129 172 166	134 166 169
	10^{-1} Neat Virus Stock Suspension* (dilution produces infectivity of 47% of cells)	0 24 48	16 16 16	123 71 67	115 72 65
Parainfluenza 3	Neat Virus Stock Suspension* (neat produces infectivity of 57% of cells)	0 24 48	24 24 24	24 26 26	32 28 19
	10^{-1} Neat Virus Stock Suspension* (dilution produces infectivity of 51% of cells)	0 24 48	24 24 24	2 12 8	8 10 4
Respiratory Syncytial Virus	Neat Virus Stock Suspension* (neat produces infectivity of 47% of cells)	0 24 48	24 24 24	178 251 183	248 208 232
	10^{-1} Neat Virus Stock Suspension* (dilution produces infectivity of 8% of cells)	0 24 48	24 24 24	17 28 14	13 21 16

Organism	Organism Concentration	Holding Time (hours)	Incubation Time Before Reading (hours)	Viability Challenge at 4°C Fluorescing cytoplasmic inclusions/200 ml[2]	Viability Challenge at RT Fluorescing cytoplasmic inclusions/200 ml[2]
Varicella Zoster Virus	Neat Virus Stock Suspension* (neat produces infectivity of 8% of cells)	0 24 48	72 72 72	TNTC[1] TNTC[1] 283	TNTC[1] TNTC[1] 424
	1:2 Neat Virus Stock Suspension* (dilution produces infectivity of 2% of cells)	0 24 48	72 72 72	TNTC[1] TNTC[1] 132	TNTC[1] TNTC[1] 159
Chlamydia pneumoniae	Neat Chlamydia Stock Suspension* (neat produces TNTC1 cytoplasmic inclusions over entire HeLa DHI shell vials coverslip)	0 24 48	3 3 3	TNTC[1] TNTC[1] 201	TNTC[1] TNTC[1] 136
	10-1 Neat Chlamydia Stock Suspension* (dilution produces TNTC1 cytoplasmic inclusions over entire HeLa DHI shell vials coverslip)	0 24 48	3 3 3	256 175 39	257 276 17
Chlamydia trachomatis	Neat Chlamydia Stock Suspension* (neat produces TNTC1 cytoplasmic inclusions over entire BGMK DHI shell vials coverslip)	0 24 48	3 3 3	TNTC[1] TNTC[1] 317	TNTC[1] TNTC[1] 50
	10-1 Neat Chlamydia Stock Suspension* (dilution produces TNTC1 cytoplasmic inclusions over entire BGMK DHI shell vials coverslip)	0 24 48	3 3 3	216 164 67	171 48 6

Organism	Organism Concentration	Holding Time (hours)	Incubation Time Before Reading (days)	Viability Challenge at 4°C CFU/200 ml[2]	Viability Challenge at RT CFU/200 ml[2]
Mycoplasma hominis	Neat Mycoplasma Stock Suspension*: Four *Mycoplasma hominis* Bacti™ disks reconstituted into 20ml of PPLO broth and incubated in 5-10% CO_2 at 35°C - 37°C for 48 hours (reference Remel Mycoplasma Bacti™ Disk Pack Insert TI No. 19314)	0 24 48	7 7 7	~ 1000, TNTC[1] ~ 1000, TNTC[1] ~ 1000, TNTC[1]	~ 1000, TNTC[1] ~ 1000, TNTC[1] ~ 1000, TNTC[1]
	10^{-2} Neat Mycoplasma Stock Suspension*	0 24 48	7 7 7	17 17 11	16 10 12

Mycoplasma pneumoniae	Neat Mycoplasma Stock Suspension*: Four *Mycoplasma pneumoniae* Bacti™ disks reconstituted into 20ml of SP4 broth with glucose and incubated in ambient air at 35°C - 37°C for 7-14 days until broth becomes yellow (reference Remel Mycoplasma Bacti™ Disk Pack Insert TI No. 19314)	0 24 48	7 7 7	171 219 183	169 238 184
	10^{-1} Neat Mycoplasma Stock Suspension*	0 24 48	7 7 7	17 22 17	18 26 19
Ureaplasma urealyticum	Neat Ureaplasma Stock Suspension*: Ten *Ureaplasma urealyticum* Bacti™ disks reconstituted into 18ml of 10B broth and incubated in ambient air 35°C - 37°C for 24 hours (reference Remel Ureaplasma Bacti™ Disk Pack Insert TI No. 19315)	0 24 48	3 3 3	1020 1136 1249	1125 1083 1056
	10^{-1} Neat Ureaplasma Stock Suspension*	0 24 48	3 3 3	101 107 116	83 108 103

* 100 ml of suspension dosed onto the swab tip then swab placed in UTM tube containing 3ml of transport medium

[1] TNTC= Too numerous to count

[2] Average of triplicate tests performed on 200 ml aliquots of UTM medium at each time point

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