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QUIDEL | Solana® GAS ASSAY

FOR USE WITH SOLANA
For the qualitative detection of Group A β-hemolytic Streptococcus (*Streptococcus pyogenes*) nucleic acids isolated from throat swab specimens obtained from patients with signs and symptoms of pharyngitis, such as sore throat.

For *in vitro* diagnostic use.

℞ ONLY

A symbols glossary can be found at quidel.com/glossary.

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INTENDED USE

The Solana GAS Assay is a rapid *in vitro* diagnostic test for the qualitative detection of Group A β-hemolytic Streptococcus (*Streptococcus pyogenes*) nucleic acids isolated from throat swab specimens obtained from patients with signs and symptoms of pharyngitis, such as sore throat. The Solana GAS Assay is intended for use only with the Solana instrument.

SUMMARY AND EXPLANATION

Group A streptococcus (GAS; *Streptococcus pyogenes*) is the most common bacterial cause of acute pharyngitis and GAS pharyngitis or "Strep throat" is most common in school-age children, affecting approximately 1 in 10 children per year.[1] GAS pharyngitis is a costly disease to society due to medical care and absence from school. In the United States, it is estimated that GAS pharyngitis costs the community up to 500 million USD per year.[2]

Acute pharyngitis is one of the most frequent illnesses for which pediatricians, internists, and other primary care physicians are consulted. However, only a small percentage of patients with this condition are infected by GAS.[3] In addition to pain and discomfort, GAS pharyngitis can lead to suppurative complications such as otitis media and peri-tonsillar abscess, and non-suppurative sequelae such as rheumatic fever.[4] Since GAS pharyngitis is the only commonly occurring form of acute pharyngitis that needs antibiotic therapy, for a patient with acute pharyngitis, the clinical decision that usually needs to be made is whether the pharyngitis is attributable to GAS.[3]

As early treatment with appropriate antibiotics is known to reduce symptom severity and duration, decrease transmission of the organism, and reduce the risk of acute rheumatic fever, rapid and accurate detection is important.[5-8] In addition, accurate diagnosis can reduce the unnecessary use of antibiotics and potential development of antibiotic resistance, as most pharyngitis is viral in origin.[9,10] However, accurate diagnosis of GAS pharyngitis is difficult for a number of reasons. First, diagnosis of GAS pharyngitis using clinical signs alone is unreliable; physicians miss up to 50% of GAS pharyngitis cases and identify 20% to 40% of non-GAS sore throat cases as requiring antibiotics.[11] Second, the standard procedure for laboratory detection of GAS, culture on blood agar, typically requires 24 to 48 hours. Physicians must therefore treat patients presumptively while awaiting culture results or withhold antibiotic therapy until the presence of *Streptococcus pyogenes* is confirmed with culture. Third, many children are asymptomatic carriers of GAS, with the prevalence of GAS throat carriage estimated at 12%.[12] Since the 1980s, commercial rapid antigen detection tests (RADTs) have been available as a means of GAS detection. The advantage of rapid diagnostic tests is that they can be quickly performed in the physician's office.

Solana GAS Assay, when performed on the Solana instrument, allows for the rapid, accurate detection of GAS without the need for culture confirmation. The assay is performed in the Solana instrument, where GAS DNA is amplified by isothermal Helicase Dependent Amplification (HDA) reaction which amplifies a GAS specific sequence in the presence of a process control sequence.[13,14] The amplicons are simultaneously detected by fluorescence probes.

PRINCIPLE OF THE TEST

The Solana GAS Assay amplifies and detects GAS DNA present in throat swab specimens obtained from symptomatic patients.

The assay consists of two major steps: (1) specimen preparation, and (2) amplification and detection of target sequence specific to GAS using isothermal Helicase-Dependent Amplification (HDA) in the presence of target-specific fluorescence probe.

Patient specimen on a throat swab is transferred to a Lysis Tube and subjected to heat-treatment at 95°C for 5 minutes. The heat-treated sample is added to a Dilution Tube, and then transferred to a Reaction Tube. The Reaction Tube contains lyophilized HDA reagents, dNTPs, primers and probes. Once rehydrated with the diluted sample, the Reaction Tube is placed in Solana for amplification and detection of GAS-specific target sequence. In Solana, the target sequence is amplified by GAS specific primers and detected by a GAS specific fluorescence probe included in the Reaction Tube. A competitive process control (PRC) is included in the Lysis Tube to monitor sample processing, inhibitory substances in clinical samples, reagent failure or device failure. The PRC target is amplified by GAS specific primers and detected by a PRC specific fluorescence probe.

The target and PRC probes are labeled with a quencher on one end and a fluorophore on the other end. In addition, the target and PRC probes carry a ribonucleic acid. Upon annealing to GAS or PRC amplicons, the fluorescence probes are cleaved by RNaseH2 and the fluorescence signal increases due to physical separation of fluorophore from quencher. Solana measures and interprets the fluorescent signal, using on-board method-specific algorithms. Solana will then report the test results to the user on its display screen, and it can print out the results via a printer.

MATERIALS PROVIDED

Cat. #M301
48 Tests per Kit

Component	Quantity	Storage
Dilution Buffer	48 tubes/kit 0.5 mL	2°C to 8°C
Lysis Buffer	48 tubes/kit 0.5 mL	2°C to 8°C
Reaction Tubes	48 tubes/kit	2°C to 8°C

MATERIALS REQUIRED BUT NOT PROVIDED

- External controls for Group A Streptococcus (e.g. Quidel Molecular Strep A+G Control Set (M111), which contains positive and negative controls, serves as an external processing and extraction control)
- Sterile DNAse-free filter-blocked or positive displacement micropipettor tips
- Micropipettor
- Stopwatch or timer
- Vortex Mixer
- Scissors or a blade
- Workflow Tray and Transfer Rack Heat block capable of 95° ± 2°C temperature
- Thermometer
- Solana instrument

OPTIONAL MATERIALS NOT PROVIDED

- Integra Voyager and pipette tips

WARNINGS AND PRECAUTIONS

- For *in vitro* diagnostic use.
- Refer to the Solana User Manual for further information regarding instrument installation and operation.
- Only use the protocol described in this package insert. Deviations from the protocol may give erroneous results.
- Performance characteristics of this test have been established with the specimen type listed in the Intended Use section only. The performance of this assay with other specimen types or samples has not been evaluated.
- Treat all specimen/samples as potentially infectious. Follow universal precautions when handling samples, this kit and its contents.
- All tubes should be capped tightly prior to vortexing.
- Proper sample collection, storage and transport are essential for correct results.
- Store assay reagents as indicated on their individual labels.

- Reagents are not interchangeable between lots.
- Never pool reagents from different tubes even if they are from the same lot.
- Do not use the reagents after their expiration date.
- Do not use kit components that appear to be broken or damaged.
- Do not interchange caps among reagents as contamination may occur and compromise test results.
- Only open the tubes when adding aliquots into tubes or removing aliquots from tubes. Keep the tubes closed at any other time to avoid contamination.
- To avoid contamination of the environment with GAS amplicons, do not open the reaction tubes post-amplification.
- Avoid microbial and deoxyribonuclease (DNAse) contamination of reagents when removing aliquots from tubes. The use of sterile DNAse-free disposable filter-blocked or positive displacement pipettor tips is recommended.
- Use a new pipettor tip for each specimen or reagents.
- Performing the assay outside of the recommended time ranges can produce invalid results. Assays not completed within specified time ranges should be repeated.
- False negative results may occur if a specimen is improperly collected, transported or handled; or if inadequate quantities of the target nucleic acid are present in the specimen.
- Test results should be interpreted in conjunction with other laboratory and clinical data.
- Positive test results do not rule out co-infections with other pathogens.
- Negative test results do not rule out possible other infections besides those caused by Group A Streptococcus.
- To avoid exposure to excessive heat, care should be taken when inserting and removing tubes from the heat block, and when handling the heated tubes.
- Additional controls may be tested according to guidelines or requirements of local, state, provincial and/or federal regulations or accrediting organizations.
- Do not pipette by mouth.
- Do not smoke, drink or eat in areas where specimens or kit reagents are being handled.
- Dispose of used devices, pipettes and specimen tubes according to your institution's safety guidelines for hazardous material.
- For accurate results, pipette carefully using only calibrated equipment. Use of inaccurate volumes may give erroneous results.
- Maintenance and decontamination of workspace and equipment should follow and be performed according to established laboratory protocols and schedules. Use micropipettes with an aerosol barrier or positive displacement tips for all procedures.
- Testing should be performed in an area with adequate ventilation.
- Dispose of containers and unused contents in accordance with Federal, State and Local regulatory requirements.
- Wear suitable protective clothing, gloves, and eye/face protection when handling the contents of this kit.
- Wash hands thoroughly after handling.
- For additional information on hazard symbols, safety, handling and disposal of the components within this kit, please refer to the Safety Data Sheet (SDS) located at quidel.com.

STORAGE AND HANDLING OF KIT REAGENTS

Store the Assay Kit at 2°C to 8°C until the expiration date listed on the outer kit box.

SPECIMEN COLLECTION, STORAGE AND HANDLING

During clinical studies, the Solana GAS Assay was evaluated with Liquid Amies Single Plastic Applicator, Liquid Stuart Single Plastic Applicator, Puritan® Liquid Amies Transport System, Copan eSwab™ Transport System and Sterile Rayon and Polyester Throat Swabs.

Analytical studies performed with contrived specimens containing Group A Streptococci, near LOD (2x LOD) demonstrated that samples can be stored at 25°C ± 2°C for 2 days and then at 2°C to 8°C for up to 6 more days before testing or at ≤–15°C or ≤–70°C for up to 34 days before testing with the Solana GAS Assay. Specific requirements for shipping specimens should follow recommendations found in section 42 and 49 of the Code of Federal Regulation, CFR.

TEST PROCEDURE

1. Turn on Solana by pressing the power button and wait until it completes self-testing.
   Note: Do not open the lid during the self-testing.
2. Warm a heating block to 95° C ± 2°C 25 minutes prior to the heat lysis step.
3. Place the required number of Lysis Tubes the Workflow tray. Mark the Lysis Tubes on the cap and/or side of the tube.
   Note: One (1) Lysis Tube is required for each specimen or control to be tested.
   Note: A maximum of 12 tests can be performed in a single Solana instrument.
4. Place a throat swab in a patient-identified Lysis Tube and vigorously twirl the swab for 10 seconds to elute specimen material. When ESwab is used for specimen collection, vortex the ESwab collection device for 5 seconds and transfer 50 µL of the ESwab transport medium to a patient-identified Lysis Tube.
   Note: The specimens in Lysis Tubes may be stored at room temperature (20°C to 25°C) or at 2°C to 8°C for up to 24 hours.
5. Heat the Lysis Tubes at 95° +2°C for 5 minutes and then mix by either vortexing the Lysis Tubes for 5 seconds or pipetting up and down a minimum of 5 times.
   Note: Begin 5-minute lysis procedure when the heat block measures 95° ± 2°C. The timer must be stopped if the temperature falls out of range at any time during the 5-minute period and cannot be restarted until the heat block returns to 95° ± 2°C.
   Note: The lysed specimens may be stored at room temperature (20°C to 25°C) or at 2°C to 8°C for up to 24 hours.
6. Place the required number of Dilution Tubes in the Workflow tray. Mark the Dilution Tubes on the cap and/or side of the tube.
   Note: One (1) Dilution Tube is required for each specimen or control to be tested.
7. Transfer 50 µL of each specimen to an identified Dilution Tube. Close the cap and mix the solution well by vortexing the tubes for 5 seconds, or with cap open, pipette up and down a minimum of 5 times.
   Note: Use a new pipette tip for each specimen.
   Note: The diluted specimen or control can be stored at room temperature (20°C to 25°C) or at 2°C to 8°C for up to 5 days.
8. Remove the required number of Reaction Tubes from the protective pouch and place in the Workflow tray, remove the excess air and reseal the bag. Mark the Reaction Tubes on the cap.
9. Transfer 50 µL of the diluted specimen to the labeled Reaction Tube, mix the solution by vigorously pipetting up and down a minimum of 5 times and close the cap. The solution should be clear, free of solid material.
   Note: Use a new pipette tip for each diluted sample.
   Note: Proceed immediately to the next step. Do not allow reconstituted reaction mix to sit for longer than 15 minutes.
10. Using the Solana Transfer Rack to hold Reaction Tubes at eye-level, visually inspect each Reaction Tube to ensure pellet rehydration.
11. Open the lid and place the Reaction Tubes in Solana via the Transfer Rack. Close the lid**.**
    Note: Be sure that all tubes are in tight contact with heat block.
12. Enter User ID and Password and press ↵ (ENTER).
13. Select "NEW TEST". If Solana displays a different screen, go to the home screen.
14. Select the tube positions to use.
15. Scan the assay barcode or manually enter Lot ID/Exp Date, select "GAS Assay" from the Select Test drop-down menu and press "▶."
16. Select sample type (patient or QC) from the drop down menu and enter Sample IDs (optional; see 2nd Note in next step).
17. Close the lid and press "Start" to initiate the Solana GAS Assay. Solana will display the progress and the count-down to assay completion. Test results will be displayed on the screen in approximately 25 minutes.
    Note: To avoid laboratory contamination, once the tube has been closed and the amplification reaction started, **DO NOT** open the Reaction Tube.
    Note: While the test is running, sample ID can be entered or edited by pressing the pencil icon.
18. After the run is completed press the arrow to move to the Test Results screen. The results can be printed by selecting the print button.
    Note: Do not navigate away from this screen before printing results. Once the screen is gone it cannot be revisited. If this occurs the results can be viewed individually by going Home then selecting Review Results.

INTERPRETATION OF RESULTS

Samples	Assay Result	Interpretation
Patient specimen	POSITIVE	GAS DNA detected
	NEGATIVE	No GAS DNA detected and PRC detected
	INVALID	No GAS DNA and No PRC detected; for invalid test results, retest the same processed sample first. If the test is invalid upon retesting with the processed sample, re-process another aliquot of the same sample or obtain a new sample and re-test.

QUALITY CONTROL

The Solana GAS Assay incorporates several controls to monitor assay performance.

- The process control is used to monitor sample processing, to detect HDA inhibitory specimens and to confirm the integrity of assay reagents and Solana. The process control is included in the Lysis Buffer tube.
- The external positive control may be treated as a patient specimen. The control should be sampled and tested as if it were a swab specimen and processed as described above in the Assay Procedure. The external positive control is intended to monitor substantial reagent and Solana failure.
- The external negative control may be treated as a patient specimen. The control should be sampled and tested as if it were a swab specimen and processed as described above in the Assay Procedure. The external negative control is used to detect reagent or environmental contamination (or carry-over) by GAS DNA or amplicon.

It is recommended that the reactivity of each new lot and each new shipment of the Solana GAS Assay be verified on receipt and before use. External control tests should be performed thereafter in accordance with appropriate federal, state and local guidelines. The Solana GAS Assay should not be used in patient testing if the external controls do not produce the correct results.

LIMITATIONS

- Additional follow-up testing using the culture method is required if the result is negative and clinical symptoms persist, or in the event of an acute rheumatic fever (ARF) outbreak.
- The main laboratory technique required is pipetting. Good laboratory technique is essential for the proper performance of this assay. Due to the high analytical sensitivity of this test, extreme care should be taken to preserve the purity of all reagents, especially in cases where multiple aliquots are taken from a tube.
- The Solana GAS Assay does not distinguish between viable and non-viable organisms and may produce a positive result in the absence of living organisms.
- The Solana GAS Assay does not differentiate asymptomatic carriers of Group A Strep from those exhibiting streptococcal infection.
- Positive test results do not rule out the possibility of co-infection with other pathogens.
- As with other assays of this type, there is a risk of false negative results due to the presence of sequence variants in the amplification targets.

EXPECTED VALUES

Performance characteristics of the Solana GAS Assay were established during a prospective study conducted December, 2014 to February, 2015. One thousand eighty-two (1082) fresh throat swab specimens from female and male patients were collected at four distinct geographical sites across the United States. A single specimen was collected per patient. Samples were collected on Polyester, Nylon or Rayon Swab with liquid Amies or Polyester Swab or Rayon with liquid Stuart's.

The expected value of Group A β-hemolytic Streptococcus (*Streptococcus pyogenes*) detected with the Solana GAS Assay has been calculated for the combined sites based on the age of the patient and gender.

The gender and age demographics for each category are listed below.

Combined Study – Age and Gender Distribution		
Gender	Female	Male
Total	609	473
Age		
≤ 2 years	27	38
3 to 12 years	233	234
13 to 21 years	132	103
≥ 22 years	217	98

The overall prevalence of Group A β-hemolytic Streptococcus in patients tested during this study was 20.7% (224/1081) based on composite bacterial culture and 22.6% (244/1081) based on the Solana GAS Assay. The prevalence of Group A β-hemolytic Streptococcus (*Streptococcus pyogenes*) detected with the Solana GAS Assay has been calculated for the combined sites based on the age of the patient. One (1) specimen (0.09%) was invalid (in both the initial and repeat test no internal control was detected) and has been removed from the Expected Values table. The table below presents the data for the remaining one thousand eighty-one (1081) specimens.

Combined Study – Expected Values Based on Solana GAS Assay (N=1081)			
Group A β-hemolytic Streptococcus			
Age	Total #	Total Positive	Prevalence
≤ 2 years	65	10	15.4%
3 to 12 years	467	165	35.3%
13 to 21 years*	234	25	10.7%
≥ 22 years	315	44	14.0%

* One (1) specimen was invalid

CLINICAL PERFORMANCE

Performance characteristics of the Solana GAS Assay were established during a prospective study conducted December 2014 to February 2015. One thousand eighty-two (1082) fresh throat swab specimens from female and male patients were collected at four distinct geographical sites across the United States. A single specimen was collected per patient. Samples were collected on Polyester, Nylon or Rayon Swab with liquid Amies or Polyester Swab or Rayon with liquid Stuart's. The swabs were inoculated by conventional streak-stab culture technique onto a trypticase soy agar plate containing 5% horse red blood cells. Testing with the Solana device was performed at the four external laboratories using the same swab that was plated for the culture. All residual specimen transport media from the samples was shipped daily (with cold packs) to a central location. The transport media was cultured using the same testing protocol as that employed by the clinical sites.

One thousand eighty-two (1082) fresh throat specimens were cultured for Group A β-hemolytic Streptococcus and tested with the Solana GAS Assay. The specimens were cultured at the testing sites and the transport media was cultured at a central location. The specimen was considered positive if either the swab or the transport media was positive for β-hemolytic Streptococcus (Composite Culture) and typed as Lancefield group A by latex agglutination. The table below details the overall performance using composite culture results as a reference.

Performance Results of Solana GAS Assay for Group A β-hemolytic Streptococcus			
Overall Performance (All Sites)			
	Composite Culture		
Solana GAS Assay	Positive	Negative	Total
Positive	220	24*	244
Negative	4**	833	837
Total	224	857	1081
			95% CI
Sensitivity	220/224	98.2%	95.5% to 99.3%
Specificity	833/857	97.2%	95.9% to 98.1%

* Of the twenty-four (24) discordant specimens, sixteen (16) of these specimens were positive for GAS when tested with an additional FDA-cleared molecular device, eight (8) were negative.
** Of the four (4) discordant specimen, three (3) were negative when tested with an additional FDA-cleared molecular device.

Site 1 Performance			
	Composite Culture		
Solana GAS Assay	Positive	Negative	Total
Positive	60	5	65
Negative	1	333	334
Total	61	338	399
			95% CI
Sensitivity	60/61	98.4%	91.3% to 99.7%
Specificity	333/338	98.5%	96.6 % to 99.4%
Site 2 Performance			
	Composite Culture		
Solana GAS Assay	Positive	Negative	Total
Positive	69	9	78
Negative	1	134	135
Total	70	143	213
			95% CI
Sensitivity	69/70	98.6%	92.3% to 99.7%
Specificity	134/143	93.7%	88.5 % to 96.7%
Site 3 Performance			
	Composite Culture		
Solana GAS Assay	Positive	Negative	Total
Positive	29	6	35
Negative	0	186	186
Total	29	192	221
			95% CI
Sensitivity	29/29	100%	88.3% to 100%
Specificity	186/192	96.9%	93.4 % to 98.6%
Site 4 Performance			
	Composite Culture		
Solana GAS Assay	Positive	Negative	Total
Positive	62	4	66
Negative	2	180	182
Total	64	184	248
			95% CI
Sensitivity	62/64	96.9%	89.3% to 99.1%
Specificity	180/184	97.8%	94.5% to 99.2%

ANALYTICAL PERFORMANCE

Limit of Detection

The analytical sensitivity (limit of detection or LOD) of the Solana GAS Assay was determined using quantified (CFU/mL) cultures of two (2) *Streptococcus pyogenes* strains by serially dilution. Analytical sensitivity (LOD) is defined as the lowest concentration at which 95% of all replicates tested positive.

The LOD for the 2 *Streptococcus pyogenes* strains tested were 2.44 x10^4 CFU/mL (ATCC® #19615) and 6.81 x10^4 (ATCC #12344). Based on this data the reported LOD for the Solana GAS Assay is 6.81 x10^4 CFU/mL.

Analytical Reactivity (Inclusivity)

The reactivity of the Solana GAS Assay was evaluated against an additional seven (7) strains of *Streptococcus pyogenes*. The testing was performed near the limit of detection for the assay (1x LOD). The seven (7) strains were detected by the Solana GAS Assay in this study at a LOD of 6.81 x10^4 CFU/mL.

Bacterial Strain	Concentration CFU/mL	Strain Detected (Yes/No)
ATCC 12384	6.81 x10^4	Yes
NCIMB 13285	6.81 x10^4	Yes
CCUG 33061	6.81 x10^4	Yes
CCUG 33409	6.81 x10^4	Yes
CCUG 39158	6.81 x10^4	Yes
ATCC 49399	6.81 x10^4	Yes
CCUG 53553	6.81 x10^4	Yes

Repeatability Study

The Precision/Within Laboratory Repeatability was determined via a study, where a four-member panel (3x, 1x, 0.3x LOD and a negative sample) was tested by two (2) operators, twice a day (2X) for 12 days.

The Solana GAS Assay produces results that are highly reproducible. This observation is based on the following findings:

- All negative samples generated negative results for GAS.
- The percentage of positive High Negative (0.3x LOD) samples is 65%, this is within the target range of 20% to 80%.
- The percentage of positive of the Low Positive (1x LOD) samples was 100%.
- The percentage of positive of the Moderate Positive (3x LOD) samples was 100%.

Reproducibility Study

In order to confirm the reproducibility of the Solana GAS Assay a blinded and randomized study panel containing *Streptococcus pyogenes* negative and positive samples (3x, 1x, 0.3x LOD) were tested at three (3) test sites (one in-house laboratory and two (2) clinical sites) with three (3) instruments. Each site tested a reproducibility panel and Assay Controls for 5 days in triplicate. Testing was done by two operators at each site. Each operator ran the panel once a day using one lot of Solana GAS Assay. A total of five hundred forty (540) specimens were tested (including controls). The Solana GAS Assay generated reproducible results in this study.

Category	SITE						Overall Percent Positive		95% Confidence Interval
	Site #1		Site #2		Site #3				
	Detected:# positive / # tested	*% Positive*	*Detected:# positive / # tested*	*% Positive*	*Detected:# positive / # tested*	*% Positive*			
GAS High Negative	24/30	80%	20/30	67%	14/30	47%	58/90	64%	54 to 74%
GAS Low Positive	30/30	100%	30/30	100%	30/30	100%	90/90	100%	96% to 100%
GAS Moderate Positive	30/30	100%	30/30	100%	30/30	100%	90/90	100%	96% to 100%
GAS Negative	0/30	0%	0/30	0%	0/30	0%	0/90	0%	0% to 4%
GAS Positive Control	30/30	100%	30/30	100%	30/30	100%	90/90	100%	96% to 100%
GAS Negative Control	0/30	0%	0/30	0%	0/30	0%	0/90	0%	0% to 4%

Analytical Specificity – Cross-reactivity and Microbial Interference

An *in silico* BLAST analysis of primers used in the Solana GAS Assay against sixty-one (61) potential interfering organisms (see below) did not show evidence of cross-reactivity.

Arcanobacterium sp.	Human adenovirus F	*Lactobacillus* sp.[1]
Bacillus sp.	Human adenovirus G	*Legionella pneumophila*
Bacteroides sp.[2]	Human coronavirus 229E	Measles virus
Bordetella sp.	Human coronavirus HKU1	Human Metapneumovirus
Branhamella sp.	Human coronavirus NL63	*Moraxella* sp.
Burkholderia sp.	Human enterovirus A	Mumps virus
Campylobacter sp.[3]	Human enterovirus B	*Mycoplasma pneumoniae*
Candida sp.	Human enterovirus C	*Neisseria* sp.
Corynebacterium sp.	Human enterovirus D	*Peptostreptococcus* sp.
Cytomegalovirus	Human herpesvirus 1	*Proteus* sp.
Enterobacterio phage MS2	Human herpesvirus 2	*Pseudomonas* sp.
Enterococcus sp.	Human herpesvirus 4	Respiratory syncytial virus Type B
Escherichia coli	Human parainfluenza virus 1	*Saccharomyces cerevisiae*
Fusobacterium sp.	Human parainfluenza virus 2	*Serratia* sp.
Haemophilus sp.	Human parainfluenza virus 3	*Staphylococcus* sp.
Human adenovirus A	Human parainfluenza virus 4a and 4b	*Treponema* sp.
Human adenovirus B	Influenza virus A	*Veillonella* sp.
Human adenovirus C	Influenza virus B	*Yersinia* sp.
Human adenovirus D	Influenza virus C	*Prevotella oralis*[4]
Human adenovirus E	*Klebsiella* sp.	*Parvimonas micra*[5]
Veillonella parvula		

A study was performed to evaluate the performance of the Solana GAS Assay in the presence of forty-six (46) other microorganisms commonly found in throat specimens. Each potentially interfering microorganism was tested in the presence of 2 x LOD Group A *Streptococcus* (2 strains) in the presence of clinically relevant levels of viruses (10^5pfu/ml) and bacteria (10^6cfu/mL) or higher. All strain combinations were spiked on to swabs. The strains included in the cross-reactivity study are shown in the table below.

Acinetobacter lwoffii	*Staphylococcus epidermidis* MRSE
Arcanobacterium haemolyticum	*Stenotrophomonas maltophilia*
Bacillus cereus	*Streptococcus agalactiae*
Bordetella pertussis	*Streptococcus anginosus*
Burkholderia cepacia	*Streptococcus bovis*
Corynebacterium diphtheria	*Streptococcus canis*
Enterococcus faecalis	*Streptococcus dysgalactiae subsp equisimilis*
Escherichia coli	*Streptococcus gordonii (Virdans type)*
Fusobacterium necrophorum	*Streptococcus intermedius*
Haemophilus influenza type A	*Streptococcus mitis*
Klebsiella pneumonia	*Streptococcus mutans*
Lactobacillus acidophilus	*Streptococcus oralis*
Lactococcus lactis	*Streptococcus pneumoniae*

[1] Includes *L. acidophilus*

[2] Includes *B. ovatus*

[3] Includes *C. rectus*

[4] In NCBI, *Bacteroides oralis* is *Prevotella oralis*.

[5] In NCBI, *Peptostreptococcus micros* is *Parvimonas micra*.

Legionella jordanis	*Streptococcus salivarius*
Legionella micdadei	*Streptococcus sanguinis*
Legionella pneumophila	*Streptococcus suis*
Moraxella cartarrhalis	*Candida albicans*
Neisseria gonorrhoeae	Adenovirus Type 1
Neisseria subflava	Adenovirus Type 11 (Slobitski)
Peptostreptococcus micros (aka Parvimonas micra)	Influenza A
Pseudomonas aeruginosa	Influenza B
Serratia marcescens	Parainfluenza Type 4B (VR-1377)
Staphylococcus aureus MRSA	Rhinovirus Type 15 (1734)

None of the organisms or viruses tested above cross-reacts with the performance of the Solana GAS Assay.

Analytical Specificity – Interfering Substances

A study was conducted using two strains of *Streptococcus pyogenes* (ATCC 19615 and 12344) tested near LOD to evaluate the Solana GAS Assay for potential interference using a panel consisting of twenty-eight (28) common biological and chemical substances found in throat samples. Substances were introduced into the swabs at concentrations which were medically relevant. Each of the strains was tested for each substance. None of the substances tested were found to interfere with the Solana GAS Assay.

Substance Name	**Test Concentration**	**Interference? (Y/N)**
Children's Dimetapp DM Cold & Cough Elixir	25% v/v	No
Chloraseptic Max: Sore Throat Relief	10% v/v	No
BreathSavers 3 Hour Mint-Spearmint	10% w/v	No
Cepacol Sore Throat: Cherry Flavor	5% w/v	No
Robitussin Cough & Cold-CF Max	10% v/v	No
Ricola Mountain Herb Throat Drops-Sugar Free	15% w/v	No
Human Saliva	10% v/v	No
Robitussin Nighttime Cold, & Flu	10% v/v	No
Crest Pro-Health Night Mint	25% v/v	No
CVS Tussin CF	15% v/v	No
Chloraseptic Throat Cherry lozenge	10% w/v	No
Halls Cherry Mentholyptus	15% w/v	No
Tic Tac Freshmints	10% w/v	No
Zicam® Oral Mist	0.625% v/v	No
Sucrets Complete-Vapor Cherry	5% w/v	No
Acetaminophen	19.5 mg/mL	No
Aspirin	12.3 mg/mL	No
Ibuprofen	15.6 mg/mL	No
Benadryl	2.7 mg/mL	No
Crest® Complete Toothpaste	5% w/v	No
Contac® Cold + Flu Caplets Night	10% w/v	No
Children's Wal-Tap Elixir Cold & Allergy (Dimetap Children's Cold and Allergy)	25% v/v	No
Children's Wal-Tap DM Elixir Cold & Cough	25% v/v	No
Robitussin Nighttime Cough, Cold, & Flu (peak cold)	10% v/v	No
Halls Mentholyptus (not cherry flavor)	15% w/v	No
Listerine Cool Mint Antiseptic	15% v/v	No
Whole Blood	5% v/v	No
Mucin (Bovine Submaxillary Gland, type I-S)	5.0 mg/mL	No

Carryover – Cross Contamination

A study was performed where three (3) operators tested a total of 50 high *S. pyogenes* positive (1.0 x 10^6 CFU/mL) and 50 negative swabs in multiple runs. In each run, 5 positive and 5 negative swabs were tested in an alternating order and also included a positive and negative control assays.

All positive GAS samples were positive and all negative GAS samples were negative. No carryover/cross contamination was observed when the assay was performed in accordance with the package insert.

CUSTOMER AND TECHNICAL ASSISTANCE

If you have any questions regarding the use of this product, please contact Quidel Technical Support at 1.800.874.1517 (in the U.S.) or technicalsupport@quidel.com. If outside the U.S., further information can be obtained from your distributor, or directly from Quidel at one of the numbers listed below. Reference **quidel.com** to see more options for Support.

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North America, Asia-Pacific, Latin America	858.552.1100	technicalsupport@quidel.com
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INTELLECTUAL PROPERTY

Dye compounds in this product are sold under license from BioSearch Technologies, Inc. and protected by U.S. and worldwide patents either issued or under application.

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M301 – Solana GAS Assay 48-Test Kit

MDSS GmbH
Schiffgraben 41
30175 Hannover, Germany

Quidel Corporation
2005 East State Street, Suite 100
Athens, OH 45701 USA
quidel.com

PIM301007EN00 (02/20)

Revision Changes:
- Use of new pipettor eliminating the need for vortexing.
- Addition of intellectual property marking

GLOSSARY

REF Catalogue number	CE CE mark of conformity
EC REP Authorized Representative in the European Community	LOT Batch code
 Use by	 Manufacturer
 Temperature limitation	 Intended use
Rx ONLY Prescription use only	 Consult e-labeling instructions for use
 Biological risks	IVD For *In Vitro* diagnostic use
 Contains sufficient for 48 determinations	CONT Contents/Contains