enterocolitica; Haemophilus, e.g., *H. influenzae, H. parainfluenzae H. aphrophilus, H. ducreyi; Brucella*, e.g., *B. abortus, B. melitensis, B. suis, B. canis; Francisella*, e.g., *F. tularensis; Pseudomonas*, e.g., *P. aeruginosa, P. paucimobilis, P. putida, P. fluorescens, P. acidovorans, Burkholderia* (Pseudomonas) pseudomallei, *Burkholderia mallei, Burkholderia cepacia* and *Stenotrophomonas maltophilia; Campylobacter*, e.g., *C. fetus fetus, C. jejuni, C. pylori* (*Helicobacter pylori*); *Vibrio*, e.g., *V. cholerae, V. parahaemolyticus, V. mimicus, V. alginolyticus, V. hollisae, V. vulnificus*, and the nonagglutinable vibrios; *Clostridia*, e.g., *C. perfringens, C. tetani, C. difficile, C. botulinum; Actinomyces*, e.g., *A. israelii; Bacteroides*, e.g., *B. fragilis, B. thetaiotaomicron, B. distasonis, B. vulgatus, B. ovatus, B. caccae, and B. merdae; Prevotella*, e.g., *P. melaminogenica*; genus *Fusobacterium; Treponema*, e.g. *T. pallidum* subspecies *endemicum, T. pallidum* subspecies *pertenue, T. carateum*, and *T. pallidum* subspecies *pallidum*; genus *Borrelia*, e.g., B burgdorferi; genus *Leptospira; Streptobacillus*, e.g., *S. moniliformis; Spirillum*, e.g., *S. minus; Mycobacterium*, e.g., *M. tuberculosis, M. bovis, M. africanum, M. avium M. intracellulare, M. kansasii, M. xenopi, M. marinum, M. ulcerans*, the *M. fortuitum* complex (*M. fortuitum* and *M. chelonei*), *M. leprae, M. asiaticum, M. chelonei* subsp. *abscessus, M. fallax, M. fortuitum, M. malmoense, M. shimoidei, M. simiae, M. szulgai, M. xenopi; Mycoplasma*, e.g., *M. hominis, M. orale, M. salivarium, M. fermentans, M. pneumoniae, M. bovis, M. tuberculosis, M. avium, M. leprae; Mycoplasma*, e.g., *M. genitalium; Ureaplasma*, e.g., *U. urealyticum; Trichomonas*, e.g., *T. vaginalis; Cryptococcus*, e.g., *C. neoformans; Histoplasma*, e.g., *H. capsulatum; Candida*, e.g., *C. albicans; Aspergillus* sp; *Coccidioides*, e.g., *C. immitis; Blastomyces*, e.g. *B. dermatitidis; Paracoccidioides*, e.g., *P. brasiliensis; Penicillium*, e.g., *P. marneffei; Sporothrix*, e.g., *S. schenckii; Rhizopus, Rhizomucor, Absidia*, and *Basidiobolus*; diseases caused by *Bipolaris, Cladophialophora, Cladosporium, Drechslera, Exophiala, Fonsecaea, Phialophora, Xylohypha, Ochroconis, Rhinocladiella, Scolecobasidium*, and *Wangiella; Trichosporon*, e.g., *T. beigelii; Blastoschizomyces*, e.g., *B. capitatus; Plasmodium*, e.g., *P. falciparum, P. vivax, P. ovale*, and *P. malariae; Babesia* sp; protozoa of the genus *Trypanosoma*, e.g., *T. cruzi; Leishmania*, e.g., *L. donovani, L. major L. tropica, L. mexicana, L. braziliensis, L. viannia braziliensis; Toxoplasma*, e.g., *T. gondii*; Amoebas of the genera *Naegleria* or *Acanthamoeba; Entamoeba histolytica; Giardia lamblia*; genus *Cryptosporidium*, e.g., *C. parvum; Isospora belli; Cyclospora cayetanensis; Ascaris lumbricoides; Trichuris trichiura; Ancylostoma duodenale* or *Necator americanus; Strongyloides stercoralis Toxocara*, e.g., *T. canis, T. cati; Baylisascaris*, e.g., *B. procyonis; Trichinella*, e.g., *T. spiralis; Dracunculus*, e.g., *D. medinensis*; genus *Filarioidea; Wuchereria bancrofti; Brugia*, e.g., *B. malayi*, or *B. timori; Onchocerca volvulus; Loa loa; Dirofilaria immitis*; genus *Schistosoma*, e.g., *S. japonicum, S. mansoni, S. mekongi, S. intercalatum, S. haematobium; Paragonimus*, e.g., *P. Westermani, P. Skriabini; Clonorchis sinensis; Fasciola hepatica; Opisthorchis* sp; *Fasciolopsis buski; Diphyllobothrium latum; Taenia*, e.g., *T. saginata, T. solium; Echinococcus*, e.g., *E. granulosus, E. multilocularis*; Picornaviruses, rhinoviruses echoviruses, coxsackieviruses, influenza virus; paramyxoviruses, e.g., types 1, 2, 3, and 4; adnoviruses; Herpesviruses, e.g., HSV-1 and HSV-2; varicella-zoster virus; human T-lymphotrophic virus (type I and type II); Arboviruses and Arenaviruses; Togaviridae, Flaviviridae, Bunyaviridae, Reoviridae; Flavivirus; Hantavirus; Viral encephalitis (alphaviruses [e.g., Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis]); Viral hemorrhagic fevers (filoviruses [e.g., Ebola, Marburg] and arenaviruses [e.g., Lassa, Machupo]); Smallpox (variola); retroviruses e.g., human immunodeficiency viruses 1 and 2; human papillomavirus [HPV] types 6, 11, 16, 18, 31, 33, and 35.

[0199] In various embodiments, the probe can be selective for a polynucleotide sequence that is characteristic of an organisms selected from the group consisting of *Pseudomonas aeruginosa, Proteus mirabilis, Klebsiella oxytoca, Klebsiella pneumoniae, Escherichia coli, Acinetobacter Baumannii, Serratia marcescens, Enterobacter aerogenes, Enterococcus faecium*, vancomycin-resistant *enterococcus* (VRE), *Staphylococcus aureus*, methecillin-resistant *Staphylococcus aureus*(MRSA), *Streptococcus viridans, Listeria monocytogenes, Enterococcus* spp., *Streptococcus* Group B, *Streptococcus* Group C, *Streptococcus* Group G, *Streptococcus* Group F, *Enterococcus faecalis, Streptococcus pneumoniae, Staphylococcus epidermidis, Gardenerella vaginalis, Micrococcus* sps., *Haemophilus influenzae, Neisseria gonorrhoeee, Moraxella catarrahlis, Salmonella* sps., *Chlamydia trachomatis, Peptostreptococcus productus, Peptostreptococcus anaerobius, Lactobacillusfermentum, Eubacterium lentum, Candida glabrata, Candida albicans, Chlamydia* spp., *Camplobacter* spp., *Salmonella* spp., smallpox (variola major), *Yersina Pestis*, Herpes Simplex Virus I (HSV I), and Herpes Simplex Virus II (HSV II).

[0200] In various embodiments, the probe can be selective for a polynucleotide sequence that is characteristic of Group B *Streptococcus*.

[0201] In various embodiments, a method of carrying out PCR on a sample can further include one or more of the following steps: heating the biological sample in the microfluidic cartridge; pressurizing the biological sample in the microfluidic cartridge at a pressure differential compared to ambient pressure of between about 20 kilopascals and 200 kilopascals, or in some embodiments, between about 70 kilopascals and 110 kilopascals.

[0202] In some embodiments, the method for sampling a polynucleotide can include the steps of: placing a microfluidic cartridge containing a PCR-ready sample in a receiving bay of a suitably configured apparatus; carrying out PCR on the sample under thermal cycling conditions suitable for creating PCR amplicons from the neutralized polynucleotide in the sample, the PCR-ready sample comprising a polymerase enzyme, a positive control plasmid, a fluorogenic hybridization probe selective for at least a portion of the plasmid, and a plurality of nucleotides; contacting the neutralized polynucleotide sample or a PCR amplicon thereof with the at least one fluorogenic probe that is selective for a polynucleotide sequence, wherein the probe is selective for a polynucleotide sequence that is characteristic of an organism selected from the group consisting of gram positive bacteria, gram negative bacteria, yeast, fungi, protozoa, and viruses; and detecting the fluorogenic probe, the presence of the organism for which the one fluorogenic probe is selective is determined.

[0203] Carrying out PCR on a PCR-ready sample can additionally include: independently contacting each of the neutralized polynucleotide sample and a negative control polynucleotide with the PCR reagent mixture under thermal cycling conditions suitable for independently creating PCR amplicons of the neutralized polynucleotide sample and PCR