What is claimed is:

1. A point-of-care/point-of-contact (POC) diagnostic system for detecting a gene-of-interest comprising:

a) a sample obtained from a material-of-interest;

b) a strand displacement DNA polymerase enzyme;

c) reagents, buffers, diluents, serums, enzyme co-factors, and dNTPs;

d) a set of at least 5 primers specific to the gene-of-interest;

e) a heating and reader device and;

f) data management software;

wherein the reagents and enzymes are dried in one location of a test tube and the primers are dried in a separate location of said test tube;

wherein the enzymes and primers are dried under vacuum at room temp for 4 h to 24 h or under in a dry heat oven set at 40ºC to 60ºC and incubated for up to 2 hours or by freeze-drying;

wherein the POC diagnostic system completes target gene amplification and detection within 90 minutes of sample collection; and

wherein the sample is optionally processed in less than four steps using additives, but without the purification of nucleic acids.

2. The POC diagnostic system of claim 1, further comprising a magnetic stick or magnetic comb for processing the sample by binding nucleic acids released from the sample,

wherein the magnetic stick or magnetic comb comprise a body and a magnet, wherein the body is bound to the magnet on the distal end of the body,

wherein the body of the magnetic stick or the magnetic comb is comprised of a low density polyethylene, high density polyethylene, polypropylene, polyethylene terephthalate, polystyrene, polyvinyl chloride, polyoxymethylene, acrylic (polymethyl methacrylate), polyurethane, polycarbonate, polytetrafluoroethylene, polyetherimide, polyether ether ketone, nylon (polyamide), bamboo, wood, or metal (iron, aluminum, zinc, copper, magnesium, and alloys thereof), and

wherein the magnet of the magnetic stick or magnetic comb is comprised of neodymium, iron-nitride, tetraenite, hematite, magnetite, maghemite, alnico, ferrite, samarium cobalt, magnetic rubber, ilmenite, ulvospinel or electromagnet, and wherein the magnet attracts magnetic beads within the biological sample.

3. The POC diagnostic system of claim 1, further comprising a reverse transcriptase enzyme that catalyzes RNA-DNA conversion at temperatures between 60-70ºC.

4. The POC diagnostic system of claim 1, wherein the material-of-interest is obtained from humans, non-human animals, plants, food, and water, and wherein the sample obtained from the material-of-interest is selected from a group consisting of serum, plasma, feces, urine, blood, oral fluids, bile, milk, colostrum, nasal secretions, oral secretions, ocular secretions, and fluids from tissues derived human, animal, other multicellular, complex species at risk for microbial diseases, minced, ground, mashed or similarly processed meat, fruits, vegetables, fish, bottled beverages, other processed food products with a risk of contamination with microbes, environmental surface at risk from contamination by infected animals or foods, a sample of water used to washed animals, foods, or environmental surfaces, or an enriched culture derived from the aforementioned samples.

5. The POC diagnostic system of claim 1, wherein the gene-of-interest is a marker of genetic modification that can determine species of origin for specific genetically-modified plants or animals that are used to produce human food or a marker of a microbial pathogen selected from a group consisting of a virus, bacterium, archaea, fungus, parasite or a microbial pathogen carrying a gene(s) facilitating resistance to a chemotherapeutic agent or antimicrobial drug used for treatment of disease, wherein the microbial pathogen infects a host's tissues and causes disease a host mammal, animal, insect, or plant or is a risk to cause disease in humans from contamination of food harvested from the host and wherein the virus is selected from porcine reproductive and respiratory syndrome virus (PRRSv), swine influenza virus, or avian influenza virus and wherein the bacterium selected from *Salmonella enterica* and its subspecies and serovars, *Listeria*, and *E. coli*.

6. The POC diagnostic system of claim 1, wherein the reagents are modified to reduce salts after sample addition in order to achieve a concentration under 100-120 mM and wherein the buffers and diluents for use with samples are modified to ensure pH ~8.8 with detergents such as Tween or Triton added to the high pH lysis buffer.

7. The POC diagnostic system of claim 1, wherein the serum is heated to 70ºC to 80ºC for 3 to 10 minutes to release pathogen nucleic acids and inhibit nucleases or other biomolecules that may be present in complex samples, and wherein the serum sample is treated with a high pH lysis buffer comprising sodium hydroxide or potassium hydroxide at pH >11 to facilitate release

of nucleic acids from a microbe and inhibit nucleases or other biomolecules that may be present in complex samples.

8. The POC diagnostic system of claim 1, wherein the primers are optimized to avoid primer-dimer pairs, hairpin loops, and other secondary nucleic acid interactions that limit DNA binding and/or polymerase recognition, and wherein the primer sets are selected from a group consisting of:

a) a set of primers having 99% sequence identity of SEQ ID NO: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, or the combination thereof targets a ORF7 genetic target of the PRRV genome,

b) a set of primers having 99% sequences identity to SEQ ID NO: 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 40 , 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, or the combination thereof targets a *invA* of the *Salmonella* genome and can amplify *Salmonella enterica* strains Berta, Typhimurium, 4,[5],12:i, Agona, and Braenderup ;

c) a set of primers having 99% sequences identity to SEQ ID NO: 52, 53, 54, 55, 56, 57, 58 or the combination thereof targets a *uidA* gene of an *E. coli* genome; and

d) a set of primers having 99% sequences identity to SEQ ID NO: 59, 60, 61, 62, 63, 64, or the combination thereof targets H5N1 influenza A.

9. The POC diagnostic system of claim 1, wherein the heating block and reader device is a small and compact box that heats, incubates and reads at least 10 target gene amplification reactions at once.

10. A method for detecting a gene of interest in a material-of-interest using the system of claim 1, the method comprising:

a) processing a sample for direct use in target gene amplification reactions;

b) generating a primer set targeted towards a conserved gene target;

c) drying reagents onto a test tube, wherein reaction reagents, DNA strand-displacing polymerase, and reverse transcriptase are dried at one location of a test tube and primers are dried at a second location of said test tube by heat or vacuum;

d) collecting a sample from the material-of-interest;

e) diluting the sample in buffers to achieve appropriate salt concentration and pH;

f) heating the sample to release pathogen nucleic acids and inhibit nucleases that may be present in the sample;

g) resuspending the dried reagents in the test tube using the treated sample;

h) inserting the test tube containing the treated sample into a heating and reader device capable of heating the sample at 65 ^{o}C and measuring fluorescence;

i) amplifying the DNA within 90 minutes; and

j) analyzing the measured fluorescence to detect the presence of the amplified DNA in the sample;

wherein the method is performed using 1 sample, 1 tube and is completed within 90 minutes.

11. The method of claim 10, wherein processing a sample for direct use in target gene amplification reactions comprises:

a) lysing the sample with a lysis buffer to release nucleic acids from microbe;

b) binding the nucleic acids to silica-coated beads;

c) incubating the nucleic acid bound silica-coated magnetic beads with a magnetic stick to allow the binding of the silica-coated magnetic beads to the magnetic stick;

d) washing the beads on the magnetic stick to remove contaminants and residual components of the lysis buffer;

e) eluting the nucleic acids bound to the magnetic stick into a buffer compatible with target gene amplification ;

f) transferring the eluted nucleic acids to a tube containing dried target gene amplification reagents for DNA/RNA amplification;

wherein lysis of the sample and binding of the released nucleic acid to silica-coated beads are completed in a single step; and

wherein the sample is incubated with a lysis buffer combined with silica-coated beads and the sample matrix for 5 minutes at room temperature.

12. The method of claim 10, further comprising uncoating a virus with a high pH buffer.

13. The method of claim 10, further comprising a rapid lysis method for the direct addition of milk to target gene amplification reactions comprising;

a) lysing a milk-containing sample by heat;

b) adding the lysed sample to target gene amplification reagents in a PCR tube;

c) adding polyaspartic acid to the sample in the PCR tube; and

d) running a target gene amplification reaction;

wherein the milk is whole milk, reduced fat milk, skim milk, buttermilk, powdered milk, condensed milk, or evaporated milk.

14. The method of claim 10, further comprising a sample enrichment method comprising:

a) binding a sample to a positively charged anion resin;

b) separating the ion exchange resin by centrifugation, filtration, or magnetic force if bound to magnetic beads;

c) incubating the resin and bound sample in a lysis buffer to concentrate and extract DNA into a smaller volume;

d) adding the extracted DNA or RNA to target gene amplification reagents in a PCR tube; and

e) running a target gene amplification reaction.

15. The method of claim 10, further comprising a method of concentrating bacterial from dilute samples comprising:

a) loading a sample into a first syringe pre-connected to a first syringe filter;

b) depressing a plunger on the first syringe to force the liquid through the syringe, thereby trapping the sample on the syringe filter;

c) transferring the first syringe filter with the trapped sample to a second syringe containing a smaller volume of lysis buffer;

d) depressing the plunger on the second syringe to pass the lysis buffer through the first syringe filter, thereby passing the eluted sample genomic DNA through the filter; and

e) adding the eluted genomic DNA or RNA to a target gene amplification reaction for pathogen detection;

wherein the syringe filter has a 0.45, 0.22, or 0.1 filter comprising materials selected from a group consisting of nylon, polyethersulfone, cellulose acetate, regenerated cellulose, polypropylene, glass fiber, ceramic, metal, and wood; and

wherein the method is completed in 5 minutes or less.