

Combining Comparative Genomics and Quantitative PCR to Create a Rapid, Low Cost Method to Identify Clinical Pathogens

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Microbiological diagnostics such as selective culturing have long been the standard for biochemical identification of clinical species, but are limited by the potentially lengthy time to secure a diagnosis. Several molecular technologies have improved the speed of diagnosis, but have seen limited clinical use due to their specialized instrumentation, requirement for trained personnel, and cost. We propose a novel molecular approach, combining the power of comparative genomics with quantitative PCR, which eliminates the need for costly secondary probes, antibodies, or downstream sequencing used in current molecular approaches. A comparative genomics search revealed gene targets that were unique to genus, species, or serovar. A combination of these targets is the “fingerprint” for an organism. We designed primers to query these targets and demonstrate their selectivity on a set of 20 bacterial genomes. The primers successfully discriminated between 2 closely related (>99%) serovars of *S. enterica*.