Category: **Biotechnology**

**Telomere Kit** A Universal qPCR Based Telomere Assay

**Problem Statement**

Telomeres are structures at the end of eukaryotic chromosomes that are comprised of proteins bound to repetitive DNA sequences. Telomeres protect the ends of linear chromosomes and provide several important cellular functions. The length of telomere DNA shortens at each cell division, and telomere shortening can eventually lead to cellular senescence, which affects tissue function, organismal health and lifespan.

The measurement of telomere lengths is an approach used to study the health and aging of organisms. The ability to monitor the well-being of organisms and to predict their future success has important applications in both wild and captive environments. In addition, understanding telomere dynamics across the vertebrate tree of life could also lead to a better understanding of the mechanisms and evolution of aging in general.

The Universal qPCR Based Telomere Assay can measure telomere lengths in all vertebrates due to primers to ultraconserved reference elements covered by this patent which allow standard telomere primers to be normalized across vertebrates.

**Technology Overview**

Telomere lengths can be measured by quantitative polymerase chain reaction (qPCR). However, this requires reference primers to non-telomere regions which limits work in non-model organisms where the genome is not yet sequenced. Here we report a set of primers that enable qPCR-based telomere measurements in all vertebrates. A set of five primer pairs were developed to target regions highly conserved across all domains of life. We tested these five primer pairs in several branches of chordata, from sea squirts to mammals, and demonstrated how to choose the best primer pairs for several different organisms.

**Benefits:**

qPCR-based telomere length measurements are rapid and inexpensive, and require relatively common molecular biology lab infrastructure. While qPCR-based methods have been reported, they have been developed for humans, mice and some birds. To study any other organism would require the development and testing of new reference primers. The primers reported here shortcut this development time and uncertainty, enable telomere length studies to be carried out in any vertebrate. The monitoring of non-model organisms is rapidly expanding and is important for conservation, agriculture and economic goals. This technology adds the ability to monitor telomere lengths, and the associated biological consequences, for any organism of interest and will benefit investigators hoping to utilize telomere assays in their research as well as others who utilize qPCR approaches for gene expression and other quantitative applications.



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Operational in Lab Environment

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