

XII Encuentro de Cooperación Farma-Biotech

Santiago de Compostela, 26 de septiembre de 2014

Telomere Analysis Technologies: a fit-for-purpose biomarker



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Life Length

- The world leader in providing telomere diagnostics and telomerase activity measurements.
- Telomere biology studies granted **2009 Nobel prize** “for the discovery of how **chromosomes are protected by telomeres and the telomerase enzyme**”
- Abnormal shortening of telomeres has been linked to a wide variety of age-related diseases.
- Life Length has developed a proprietary **high-content screen**
- **Our robust, sensitive and reproducible** technology can be combined with other analysis to provide a comprehensive picture of cell health.

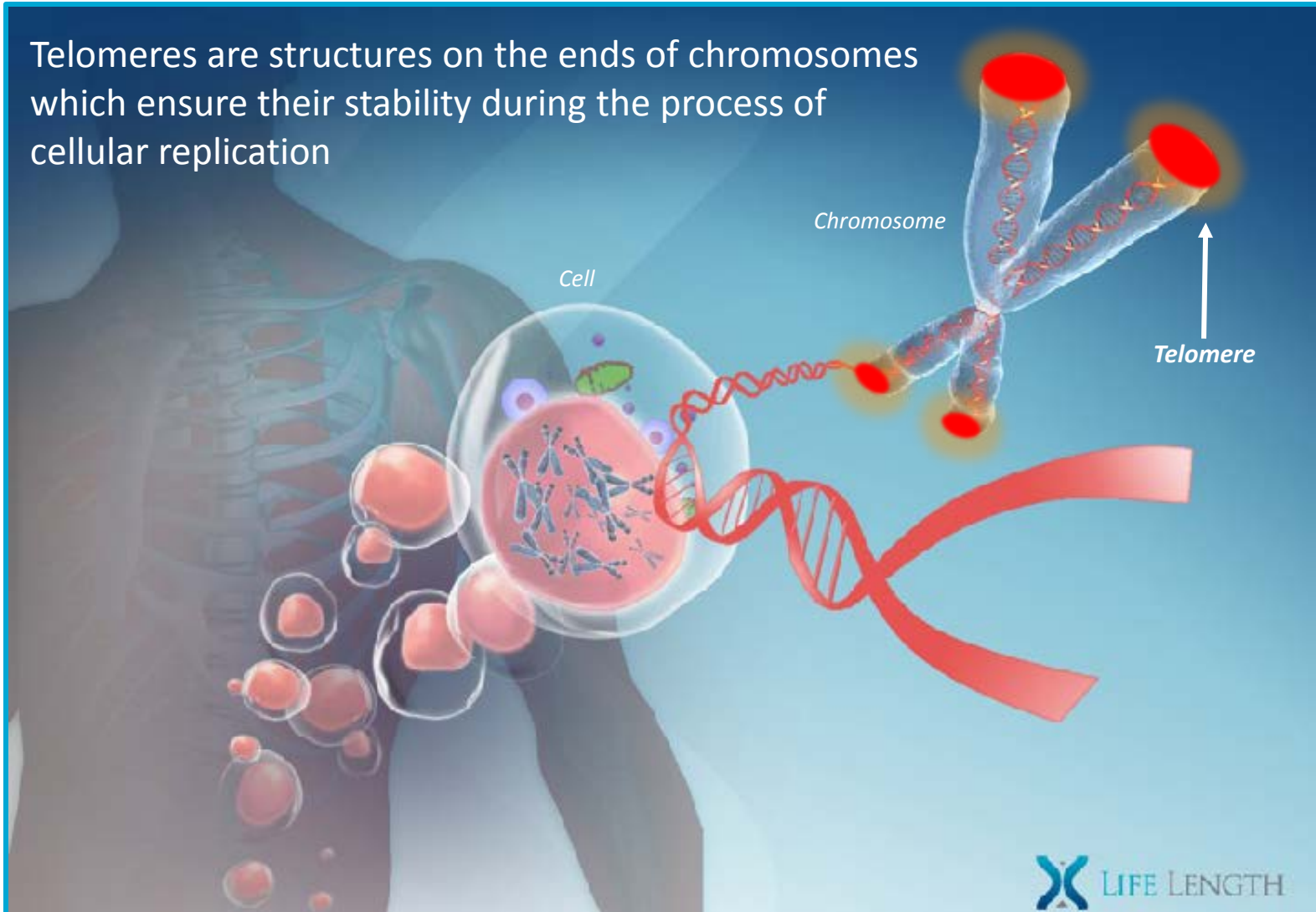


Life Length

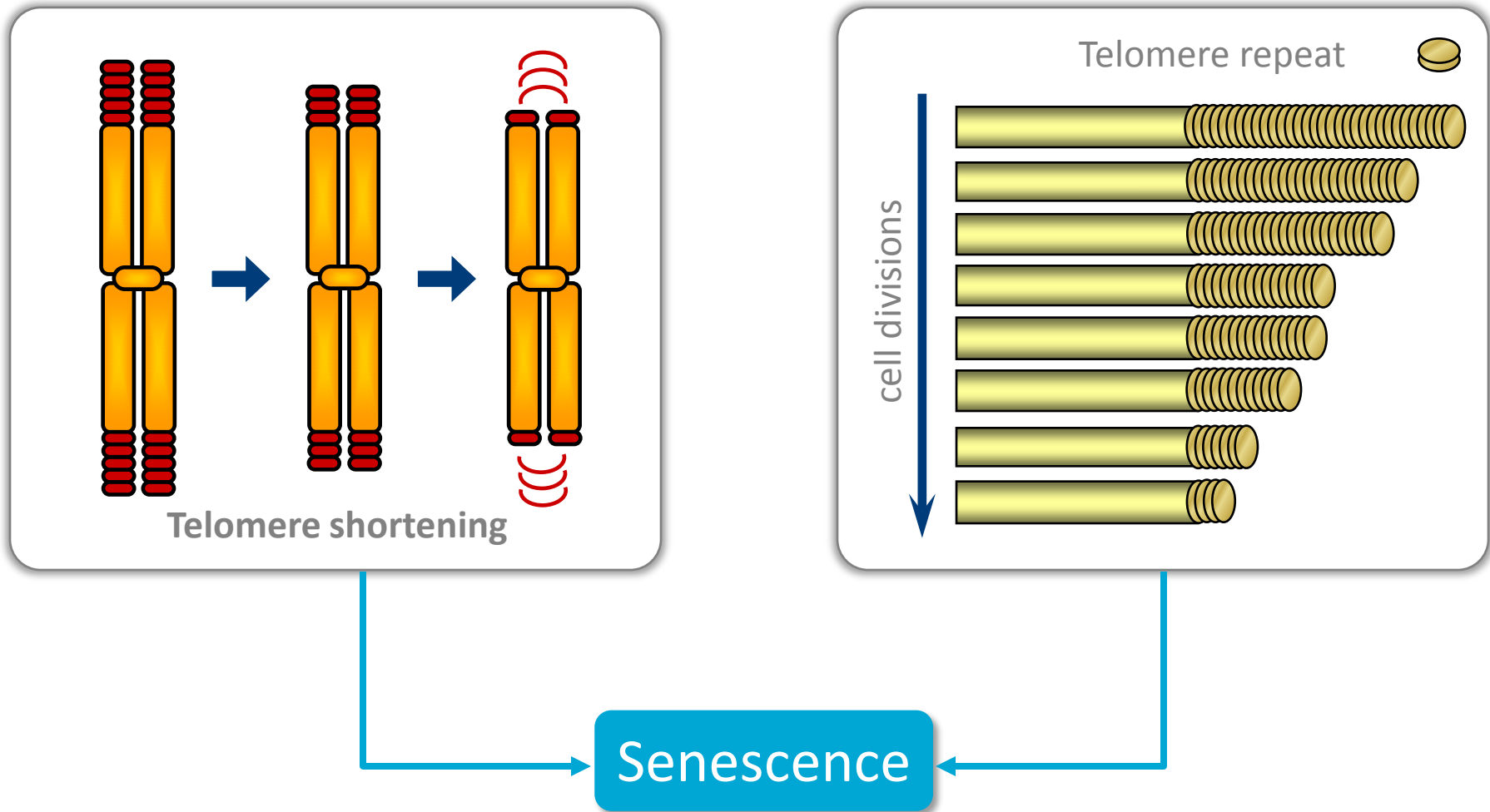
- **Spin-off** of the prestigious Spanish National Cancer Research Institute (CNIO)
 - Over **€25 million** invested to develop the product and the company
- Partner in 3 major **FP7** European studies for understanding aging and age-related.
- **World-class Scientific Advisory Board (SAB)** with scientists from U.S., U.K. and Japan
- 25 employees including SAB members, over half hold **Ph.D.'s**
- Over 1,500 people working with Life Length directly/indirectly in over **20 countries worldwide**



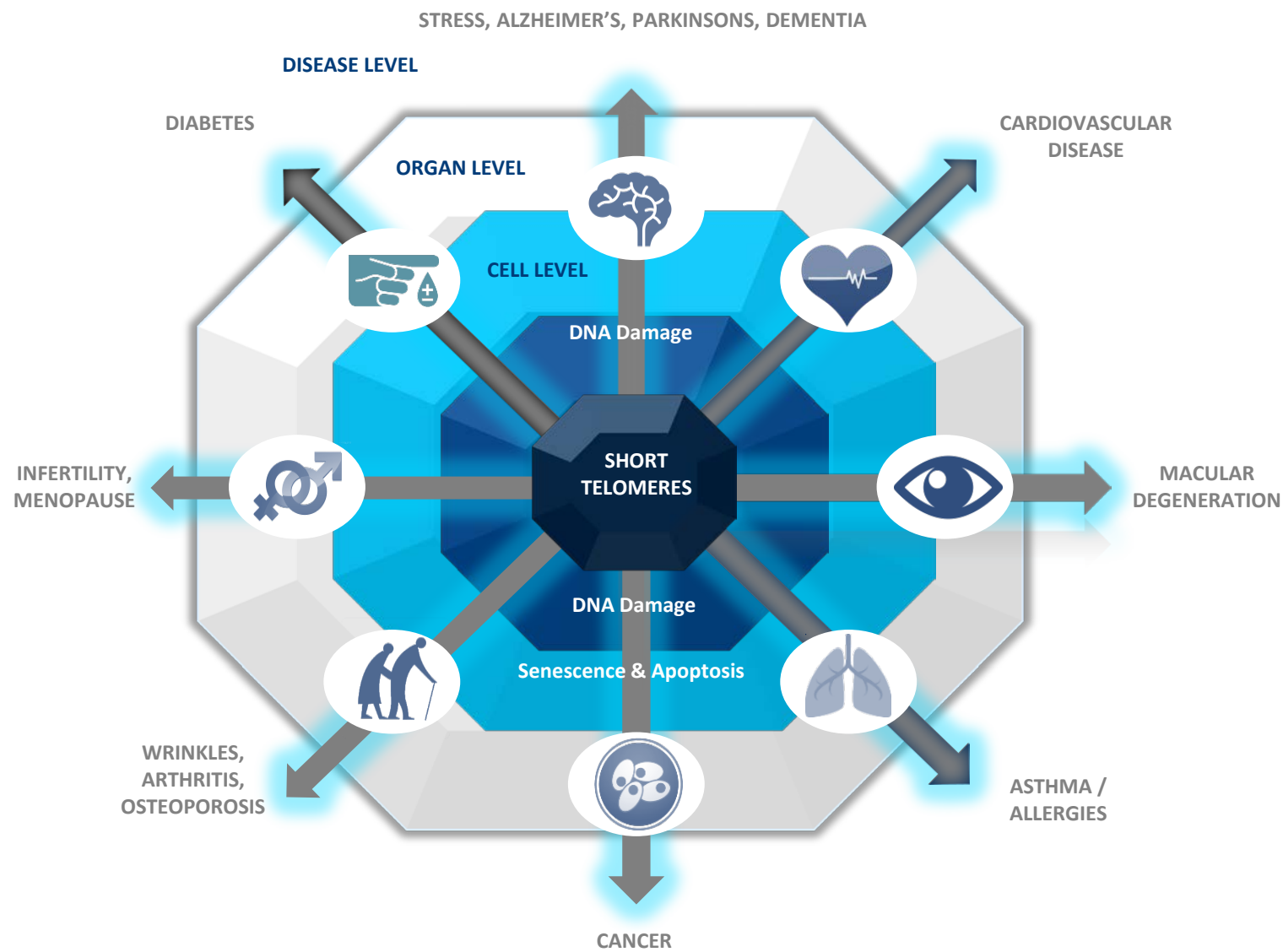
The product



Telomeres progressively shorten in all cells that divide



Target indications: short telomeres and age-related diseases



Current pipeline: Life Length technologies

Most accurate, versatile and scalable technology in the world to measure telomeres



TELOMERE
ANALYSIS
TECHNOLOGY

TAT® proprietary assay allows for the quantification of telomere length individually

TRAP

Telomeric Repeat Amplification Protocol A highly sensitive measurement of telomerase activity



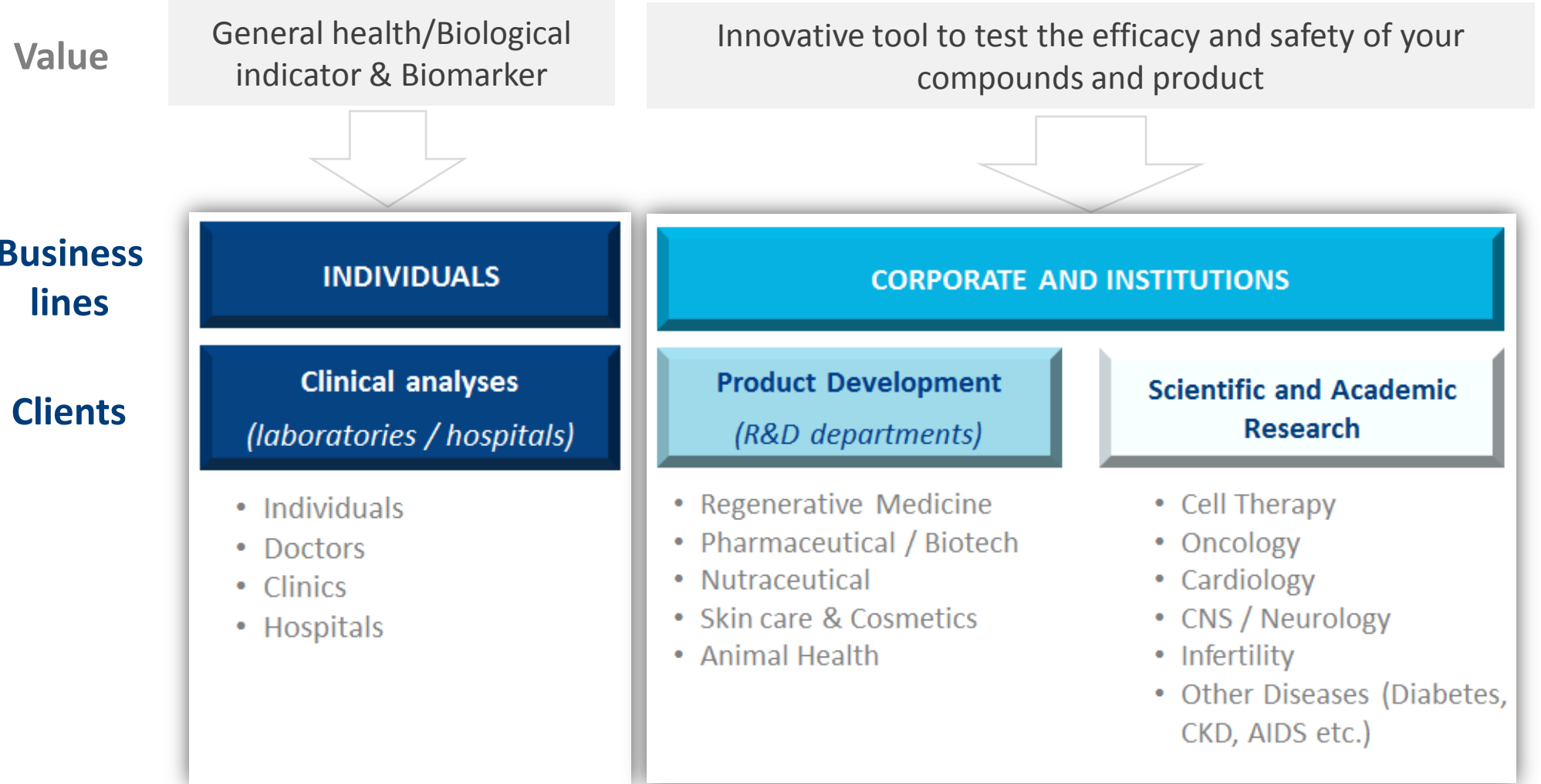
TELOMAPPING

TELOMAPPING® patented methodology to analyse telomeres in tissue samples (biopsies)

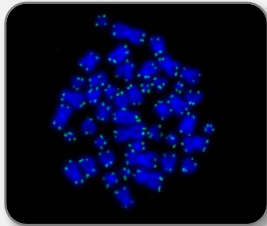
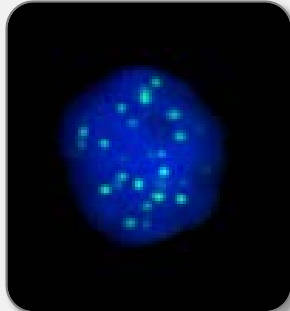

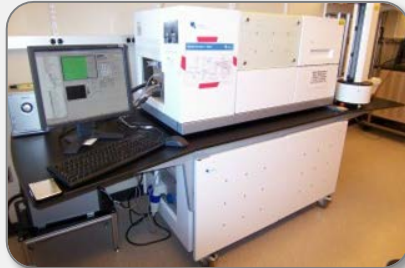


Terminal Repeat Fragment when only DNA is available

Pipeline segmentation by clients

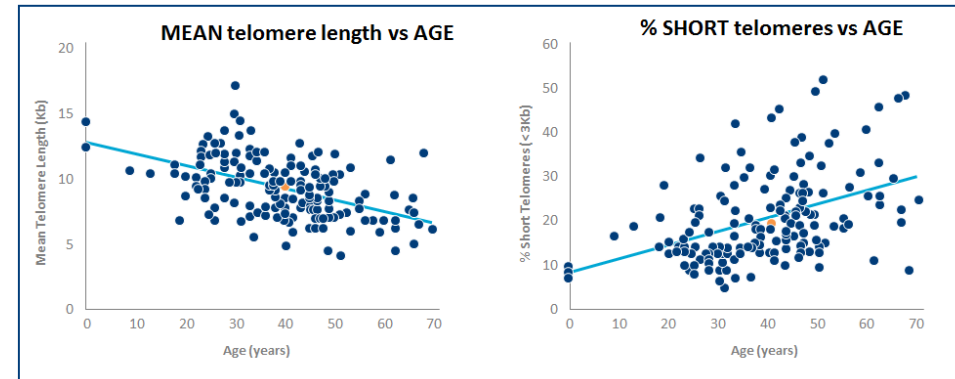


Innovative aspects: standard vs. high-throughput (HT) q-FISH

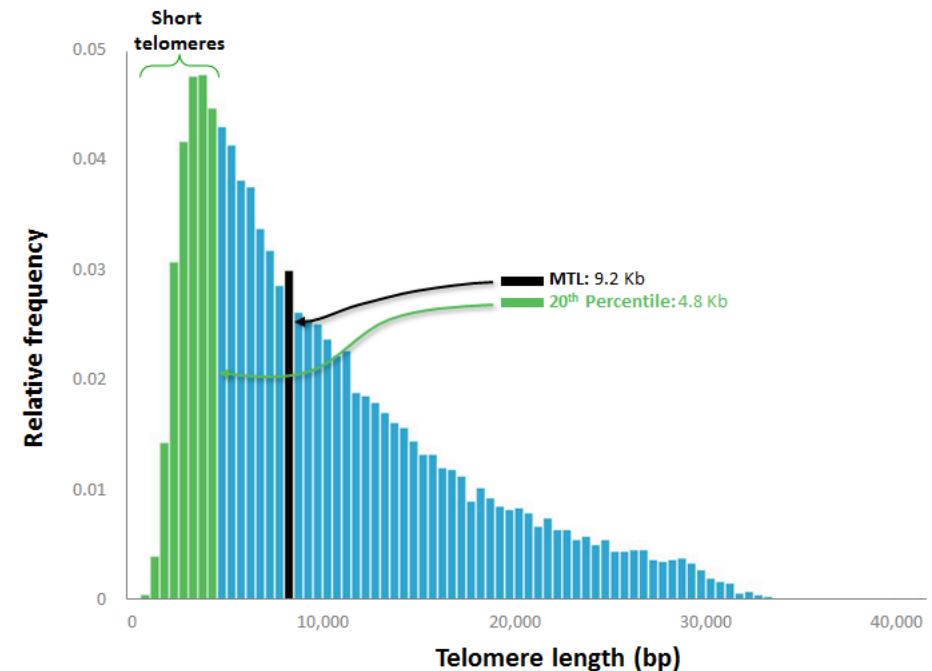
	Standard	HT	HT Advantages
Material	 <p>Analysis on metaphase spreads</p> <p>Cells in metaphase required</p>	 <p>Analysis on intact nuclei</p> <p>Mostly interphase cells</p>	<ul style="list-style-type: none"> • Less handling • Less time consuming • Possible to measure quiescent cells
Process	Processing is manual	Automated Hybridization and analysis	<ul style="list-style-type: none"> • Lower error rate • Higher reproducibility
Capture	 <p>Conventional confocal microscope</p>	 <p>HT imaging confocal microscope</p>	<ul style="list-style-type: none"> • Stand-alone process • Much higher processing capacity and high-throughput • Affordable

Innovative aspect: relevance of data reported - short Telomeres, not average telomere length determines the onset of disease

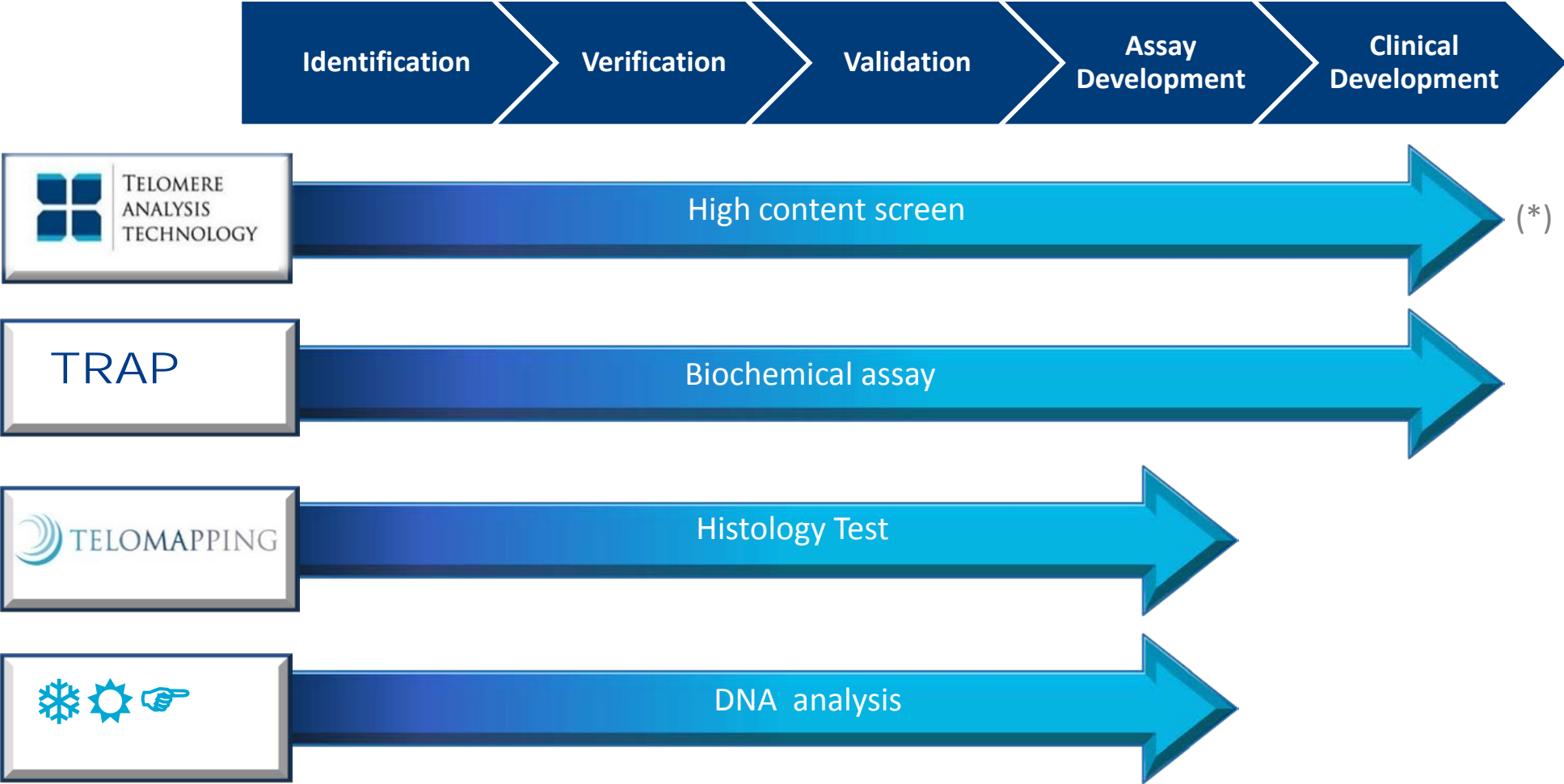
- Percent of short telomeres detect more differences between individuals than average length
- Percent of short telomeres show higher scattering as we age
- Percent of short telomeres are likely to reflect both genetic and “lifestyle choices” (environment)



- High-content screen data acquisition and analysis translates into telomere distribution graph
- Percent of short telomeres reported as detected from individual cells measurements.
- Combination with other telomere related measurements to complement related trait such as telomerase activity.



Current status of development: proof of concept and trials already performed



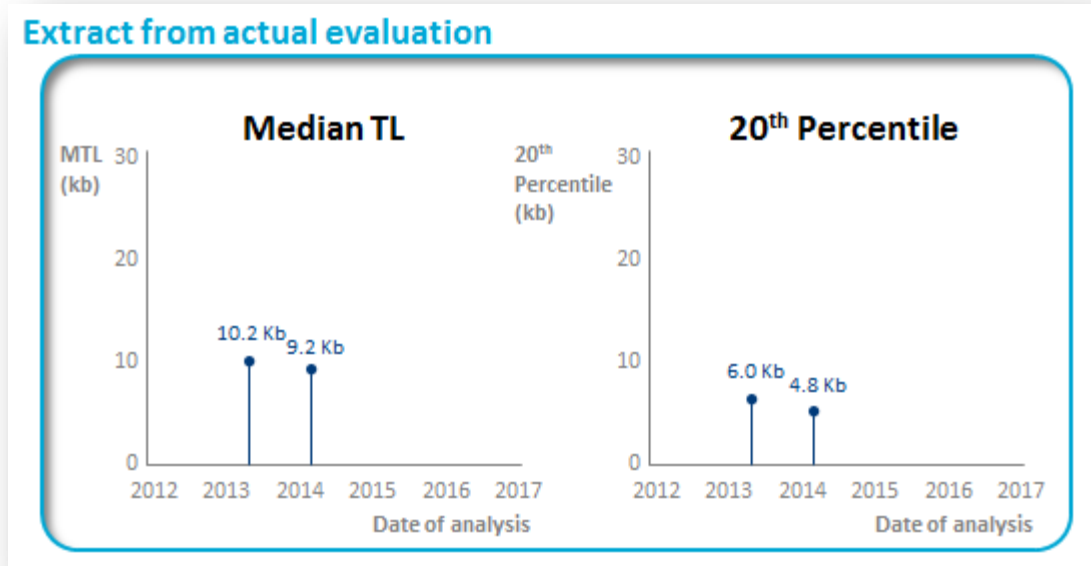
(*) CLIA certification expected 2015

Proof of Concept: characterization of cell therapy products for quality control purposes.

- Monitoring changes in telomere length during expansion of stem cell: Analysis of maturity and pluripotency
 - MSC (fat, bone marrow)
 - Chondrocytes
 - *iPC*
- *Proliferation* capacity of cell therapy product
- Batch to batch variation
- Master and working cell banks characterization
- Optimization of growth conditions

Trials already performed: response to treatment

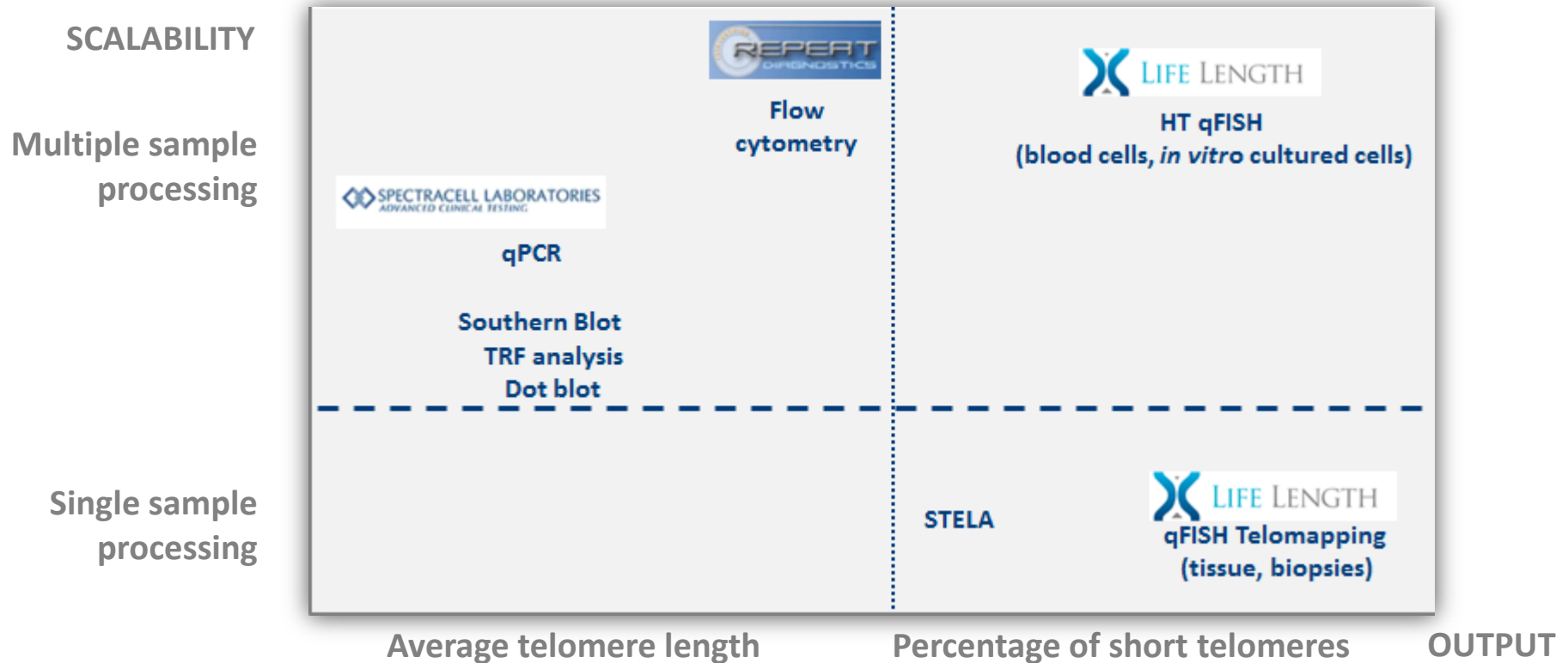
- Monitoring telomere length over time in patients
- Simple, non invasive (blood test) for early and accurate diagnosis and/or prognosis
- Combination with other telomere related measurements to complement related trait such as telomerase activity.



Longitudinal studies.

- Allows the comparison of results of multiple tests on the same individual
- Permits the identification of trends in the telomere shortening process

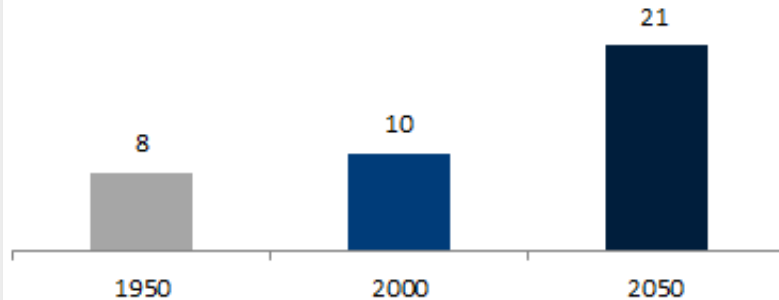
Differential features facing the market and business opportunities



Unlike other companies that only measure mean telomere length, Life Length technology detects short telomeres in individual cells providing a better measure of the rate of cellular aging

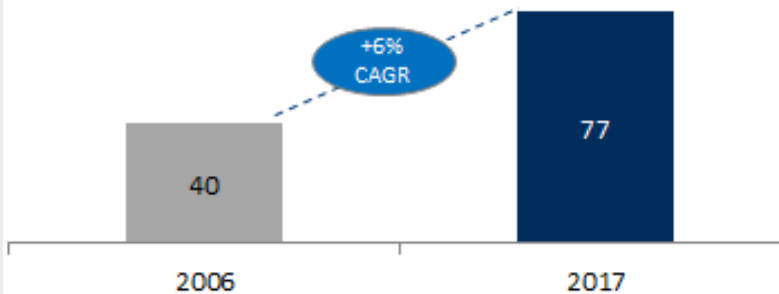
Opportunities: trends positively impacting growth

Percentage of world population over age 60



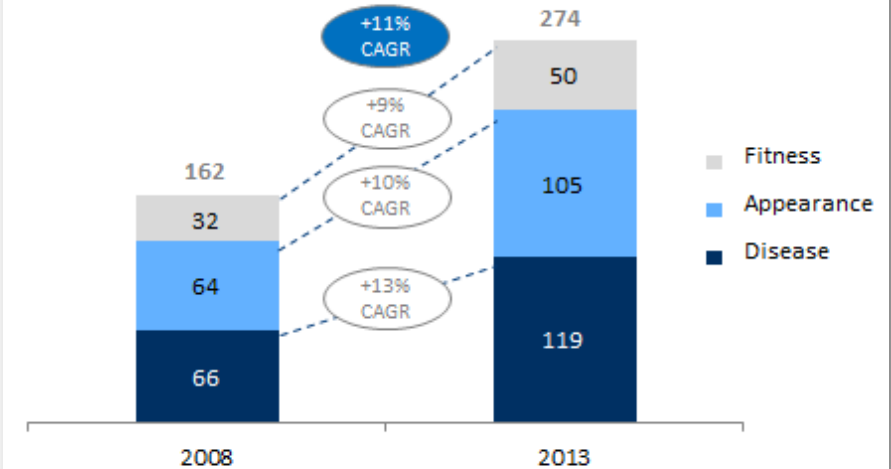
Source: World Population Aging 1950-2050 Report

Estimate of lab analysis market size; \$ bn



Source: Laboratory Corporation of America Holding – 2005, LH8-K; Global Industries Analysts – Testing Laboratories Report 2009-2017

Estimate of anti-aging market size; \$ bn



Source: Anti-aging Products and Services: The Global Market – BCC Research



- Telomapping technology is protected by granted U.S. Patent N^o 8,084,203 B2.
 - Life Length holds the exclusive commercial right for the next 30 years in return for royalties to the CNIO.



- TAT technology is protected by industrial secrecy.
 - While competing technologies may be eventually developed by others, TAT benefits from a significant time advantage as well as the difficulty of securing the investment that would be required to do so and the first-mover advantage of the company is very substantial and growing.
- Life Length intends to explore further patents post capital raising.

Pitfalls and risks to be considered

Hurdle	Risk	Consequences	Mitigation
Reproducibility	Low ($\approx 5\%$ CV)	Further optimization needed	In house R&D - continuous improvement process
Biomarker validation	Low	Unfit for regulatory purposes	CLIA certification underway
New technologies in the market	Medium	Increased market competition	Scanning testing advances related to telomere biology
Pricing/cost	Low/medium	Slow market adoption	Further automation and increased throughput
Long-lasting longitudinal studies	Medium	Longer clinical studies	Adoption as a standard biomarker for all clinical studies

Contact us!

- Life Length has developed a unique set of tools that are ready to be capitalized in R&D across many pathologies and different stages of drug development
- Technology is mature and ready to be used as a biomarker and diagnostic tool
- Diverse applications
 - Stem cell therapies
 - Hematological malignancies
 - Cardiovascular diseases
 - Other major age-related diseases
- We would welcome the opportunity to explore how we can begin working with you

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