
LifePlus
Diagnostic and Consulting Health Services

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LifePlus was founded in 2022 as a Start-Up Company within the premises of the University of Crete.

Inspirator and founder of the project:
Professor A.Tsatsakis

Chief scientific leader:
Professor A.Tsatsakis

LifePlus Scientific Personnel:

Elena Vakonaki, *BSc, MSc, PhD, ERT*

Persefoni Fragkiadaki, *Biologist, PhD, ERT*

Irene Fragkiadoulaki, *Molecular Biologist and Geneticist, PhD*

Athanasios Alegakis, *PhD*

Marios Spanakis, *PharmD, PhD*

Dimitra Nikolopoulou, *Research Assistant*

Elisavet Renieri, *PhD, ERT*

Stella Balliou, *PhD*

Nikolaos Drakoulis, *MD, PhD*

Taxiarchis Konstantinos Nikolouzakis *MD, PhD*

Evangelos Zoumbaneas, *Nutritionist, Master Practitioner in Eating Disorders and Obesity*

Elisavet Kouvidi, *Biologist-Cytogeneticist, MSc, PhD*

A dynamic & creative multidisciplinary scientific team that specializes in toxicological, pharmacological and biomedical sciences towards state-of-the-art healthcare services

Life Plus

Diagnostic and Consulting Health Services

Funded and coordinated by Prof. A. Tsatsakis,

Chairman of Toxicology & Forensics Department, Medical School at the University of Crete

University Hospital of Heraklion

Aristidis M. Tsatsakis

Professor and Director, PhD, DSc, ERT, RAS, FATS, D. Honoris C. (Carol Davila), D.H.C. (Mendeleev), D.H.C. (FEFU), Hon Professor (Erisman), Academician FM RAS, FM WAS,

Academician, Director of Toxicology & Forensic Sciences Department of the University of Crete and in University Hospital of Heraklion, Crete, Greece

HORIZON projects on nanomedicine & smoking regulations

Editor of Toxicology journals

Public Health & Toxicology
Toxicology Letters
ToxicologyReports
Human & Experimentsl Toxicology

Real-life human exposure **scenarios based on a long-term, low-dose exposure to chemical mixtures as well as** ***real-life risk simulation*** **studies**

https://en.wikipedia.org/wiki/Aristides_M._Tsatsakis

Ex President & Honorary Member of EUROTOX

Scientific leader of ToxPlus spin-off company

Oriented on toxicology and anti-ageing innovations

Highly Cited Researcher 2020 & 2021

By Clarivate Analytics

Honorary Doctor

of several Universities around the world

Social activities

on sustainable development and reduced environmental toxic load

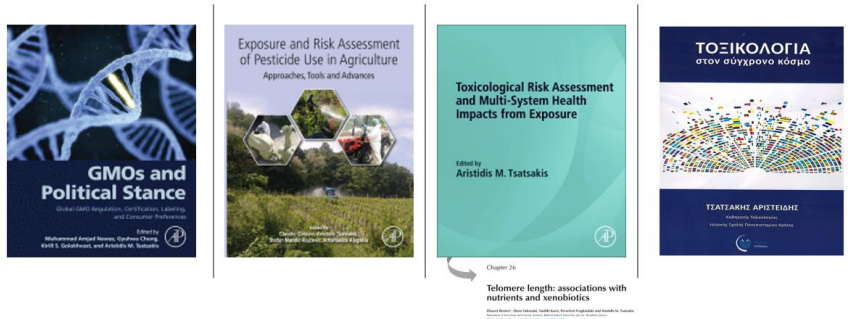
h-Index: 87 (GS) & 77 (RG)

>37,000 citations (GS)

>29,000 citations (RG)

>280,000 reads/downloads (RG)

>1000 publications



JENNY STANFORD PUBLISHING

Upcoming

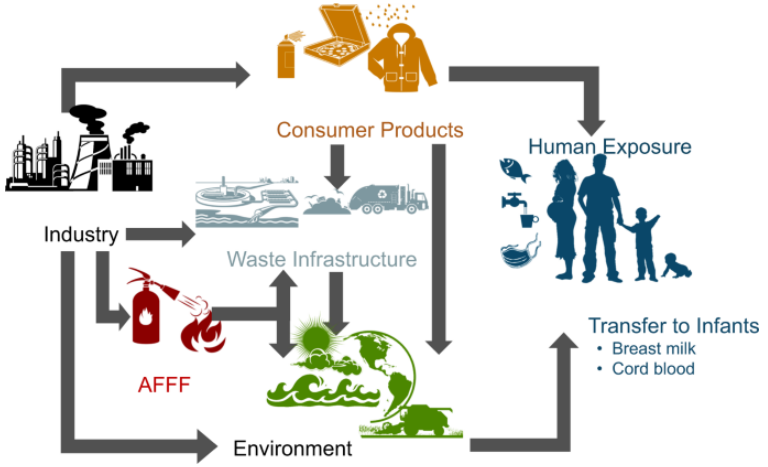
Telomere length as biomarker of a healthy life and successful ageing

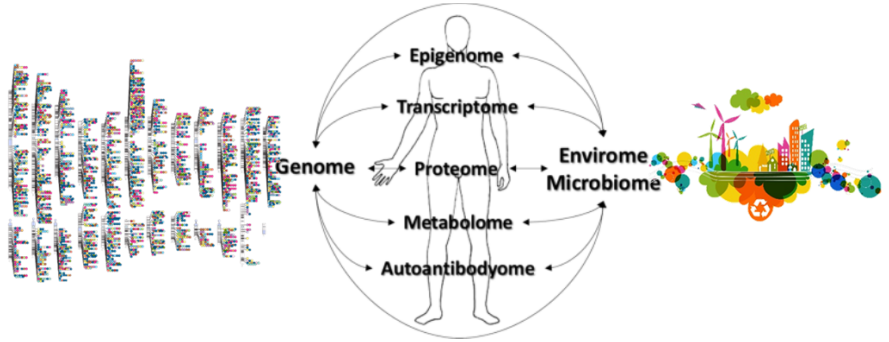
Editor: Aristidis Tsatsakis

Associate editor: Elisavet Renieri

Review editor: Paraskevi Kallinteri

Exposures In Real Life → Health impacts





The Real-Life Risk Simulation (RLRS) concept

- Low doses long term exposures
- Xenobiotics from various sources (medicines, pesticides, etc.)
- Multiple routes of exposure (environment, air, food etc.)

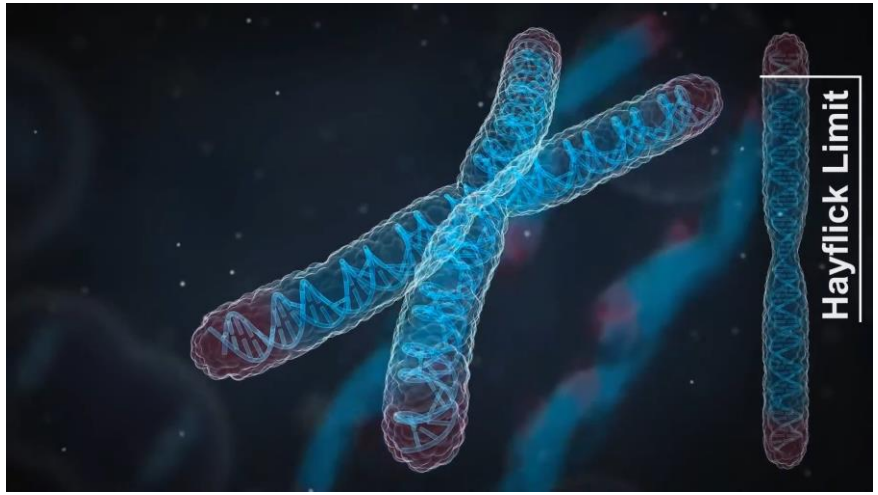
Unravelling the role of telomeres as biomarkers under the RLRS concept

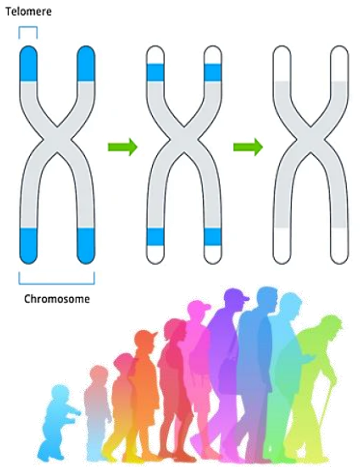
Telomeres preserve the genetic information, maintaining the integrity of the chromosomes and protecting them from degradation, recombination, or fusion.

Telomere length shortens naturally with time with a rate that is relative to the pace of aging.

Lifestyle & environmental factors are related with telomer shortening rate creating an **association** between **telomer length**, risk for **diseases** and pace of **aging**

Telomers can serve as a **biomarker** for **wellness** and **longevity** considering lifestyle habits and biochemical data





LifePlus

Diagnostic and Consulting Health Services

LifePlus aims to provide innovative preventive, predictive, personalized, and participatory biomedical services that promote well-being and healthy ageing.

Cutting-edge biomedical methods and tools employed for personalized analysis of an individual's physical condition, coupled with expert consultations to enhance overall health and metabolic biomarkers for well-being improvement.

A simple & easy to follow process

STEP 1

a. Blood / Saliva sampling
b. Questionnaire

STEP 2

Sample analysis and questionnaire evaluation

STEP 3

Personalized consultation for wellness and longevity

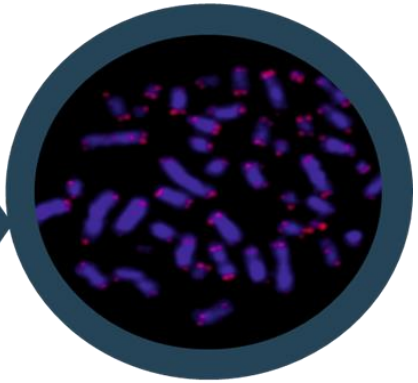
For every person who wants to carry out a thorough check-up or improve their lifestyle & overall wellness

Regular check-up of telomere characteristics allows for advanced monitoring & evaluation of health & wellness

High-tech biomedical protocols through Q-FISH & QPCR technologies to measure telomere dynamics & characteristics

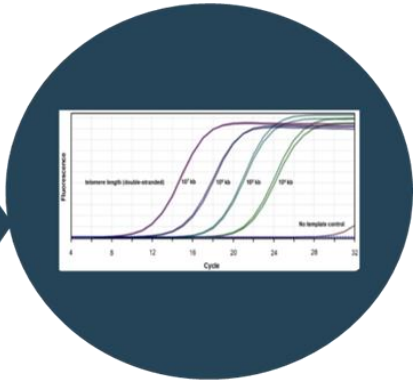
Q-FISH

allows the measurement of telomere length at each individual chromosome with high accuracy



Q-PCR

simple, fast & scalable method to achieve high throughput analysis of samples



LifePlus ToxPlus

ΦΟΡΜΑ ΚΑΤΑΓΡΑΦΗΣ ΣΤΟΙΧΕΙΩΝ ΕΞΕΤΑΖΟΜΕΝΟΥ
EXAMINEE REGISTRATION FORM

Στοιχεία Παρακολούθησης / Tracking Information

Οι ημερομηνίες συμπληρώνονται με τη μορφή ημέρα/μήνας/έτος. Τα γκρίζα «πλαίσια» συμπληρώνονται με ✕ ή ✓.

Dates are filled in as day/month/year. Gray "boxes" are filled with ✕ or ✓

Ημερομηνία Δειγματοληψίας	(ημ/μήνας/έτος)	__ /___ /____
Sampling Date	(dd/mm/yyyy)	__ /___ /____

☐ Τα δεδομένα του ερωτηματολογίου θα χρησιμοποιηθούν ανώνυμα για τη δημιουργία τράπεζας δεδομένων με σκοπό την αξιολόγησή τους σε πληθυσμιακές μελέτες.
The questionnaire data will be used anonymously to create a data bank for the purpose of evaluating them in population studies.

☐ Σε περίπτωση προβλημάτων δειγματοληψίας, τα οποία εξακριβώνονται κατά την επεξεργασία του δείγματος, η διαδικασία θα πρέπει να επαναληφθεί.
In case of sampling problems, which are ascertained during sample processing, the procedure should be repeated.

Στοιχεία Εξεταζόμενου/ Participant's Information

Κωδικός/ Code:				
Επώνυμο / Family name				
Όνομα / First name				
Τηλέφωνο/ Telephone number				
Διεύθυνση ηλ. ταχυδρομείου / email				
Ημερομηνία Γέννησης / Birth date				(ηη/μμ/εε)
Φύλο/ Gender:		Γυναίκα Woman	Άνδρας Man	Άλλο Other
Βάρος (κιλά)/ **Weight** (kg):				
Ύψος (εκατοστά) **Height** (cm):				
Εθνικότητα/ Nationality:				
Χώρα γέννησης/ Country of birth:				
1η Επίσκεψη / 1st visit		Ναι/ Yes		

Ερωτήσεις που αφορούν ΜΟΝΟ τις γυναίκες, παρούσα εγκυμοσύνη, προηγούμενες, εμμηνόπαυση
Questions about women ONLY, current pregnancy, previous, menopause

Εγκυμοσύνη /Pregnancy			
Εγκυμοσύνες (αριθμός)/ No of pregnancies			
Αριθμός τέκνων/ No of children			
Εμμηνόπαυση/ Menopause		Ναι/Yes	
Τελευταία έμμηνος ρύση (έτος)/Last period (year)			

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Ατομικό Ιατρικό Ιστορικό/ Personal medical history

Έχετε διαγνωστεί με κάποια από τις παρακάτω ασθένειες ; *Στην ύπαρξη συμπληρώνεται με ✕ ή ✓ (ύπαρξη ασθένειας). Στην αγωγή καταγράφονται στοιχεία όπως φάρμακο, δόση και έτη χορήγησης.*

Have you been diagnosed with any of the following diseases? Existence it is completed with ✕ or ✓ (existence of disease). Information such as drug, dose and years of administration are recorded in the treatment.

Καρδιαγγειακές παθήσεις/ Cardiovascular disorders	**Ύπαρξη/ Occurrence**	**Αγωγή/ Treatment**
Υψηλή αρτηριακή πίεση (υπέρταση)/ High blood pressure (hypertension)		
Στεφανιαία νόσος/ Coronary artery disease		
Αγγειακή νόσος/ Vascular disease		
Αθηροσκλήρωση/ Atherosclerosis		
Αρρυθμίες/ Arrhythmias		
Καρδιομυοπάθεια/ Cardiomyopathy		
Καρδιακή πνευμονοπάθεια/Cardiopulmonary disease		
Άλλο (καρδιολογικό) / Other (cardiovascular)		
Ενδοκρινικά Μεταβολικά νοσήματα/ Endocrine Metabolic diseases		
Υψηλή χοληστερόλη/ High cholesterol		
Υψηλά τριγλυκερίδια/ High triglycerides		
Διαβήτης / Diabetes		
Αντίσταση στην ινσουλίνη/ Insulin resistance		
Υπο ή υπερ θυρεοειδισμός/ Hypo or hyperthyroidism		
Άλλο (ενδοκρινικό)/ Other (endocrine)		
Νευροεκφυλιστικές ασθένειες/ Neurodegenerative diseases		
Εγκεφαλικά ισχαιμικά επεισόδια/ Cerebral ischemic events		
Αλτσχάιμερ/ Alzheimer's		
Πάρκινσον/ Parkinson's		
Σκλήρυνση κατά πλάκας/ Multiple Sclerosis		
Αμυοτροφική πλευρική σκλήρυνση/Amyotrophic lateral sclerosis (ALS)		
Επιληψία/ Epilepsy		
Άλλο (νευροεκφυλιστικό)/ Other (neurodegenerative)		
Μεταδοτικές ασθένειες/ Infectious diseases		
Σύφιλη/ Syphilis		
Ηπατίτιδα Β/ Hepatitis B		
Ηπατίτιδα Γ /Hepatitis C		
HIV		
Κυτταρομεγαλοϊός (CMV)/ Cytomegalovirus (CMV)		
Άλλο (μεταδοτικό)/ Other (contagious)		
Αυτοάνοσο νόσημα/ Autoimmune disease		
Ψωρίαση/ Psoriasis		
Αγγειίτιδα/ Vasculitis		
Hashimoto/ Hashimoto's		
Graves		
Ρευματοειδής αρθρίτιδα/ Rheumatoid arthritis		
Συστηματικός ερυθηματώδης λύκος/ Systemic lupus erythematosus		
Miastenia gravis		
Άλλο (αυτοάνοσο)/ Other (autoimmune)		
Ψυχικές ασθένειες/ Mental illnesses		
Σχιζοφρένεια/ Schizophrenia		

Διπολική διαταραχή/ Bipolar disorder		
Κατάθλιψη / Depression		
Αγχώδης διαταραχή/ Anxiety Disorder		
Ιδεοψυχαναγκαστική Διαταραχή / OCD		
Αϋπνία/ Insomnia		
Άλλο (ψυχικό νόσημα)/ Other (mental illness)		
Αιματολογικές παθήσεις/ Blood diseases		
Απλαστική αναιμία/ Aplastic anemia		
Διαταραχές πήξης/ Coagulation disorders		
Σιδηροπενική αναιμία/ Iron deficiency anemia		
Αναιμία ανεπάρκειας φολικού/φυλλικού οξέος/ Folate deficiency anemia		
Άλλο (αιματολογικό νόσημα)/ Other (blood disease)		
Άλλες ασθένειες/Συμπτώματα/ Other Diseases/Symptoms		
Οστεοπόρωση/ Osteoporosis		
Οστεοαρθρίτιδα/ Osteoarthritis		
Συγγενής δυσκεράτωση/ Congenital dyskeratosis		
Άσθμα/ Asthma		
ΧΑΠ/ COPD		
Πνευμονική ίνωση/ Pulmonary fibrosis		
Αλλεργίες/ Allergies		
Πονοκέφαλος/ Headache		
Δυσκοιλιότητα/ Constipation		
Δερματικές παθήσεις/ Skin diseases		
Ογκολογικά νοσήματα/ Oncological diseases		
Νοσείτε από κάποια μορφή καρκίνου;/ Do you suffer from any form of cancer?		
Νοσήσατε από κάποια μορφή καρκίνου;/ Have you suffered from any form of cancer?		
Άλλα προβλήματα υγείας ή/και χειρουργικές επεμβάσεις που θα θέλατε να δηλώσετε/ Other health problems and/or surgeries you would like to report		
Η ηλικία του βιολογικού πατέρα κατά τη γέννησή σας The age of your biological father at your birth		
Η ηλικία της βιολογικής σας μητέρας κατά τη γέννησή σας Your biological mother's age at your birth		

Διατροφικές συνήθειες και τρόπος ζωής / Dietary habits and lifestyle

Τα γκρίζα «πλαίσια» συμπληρώνονται με ✕ ή ✓ (άσκηση, αϋπνία, κατανάλωση).
Στην συχνότητα επιλέξτε: «συχνά», «κάποιες φορές», «σπάνια».
The gray "boxes" are filled with ✕ or ✓ (exercise, insomnia, consumption).
Under frecuency select: «often», «sometimes», «rarely»

Ύπνος/ Sleep	Ύπαρξη/ Occurrence	Συχνότητα/ Frecuency
Δυσκολεύεστε να κοιμηθείτε;/ Do you have trouble sleeping?		
Πόσες ώρες κοιμάστε καθημερινά;/ How many hours do you sleep daily?		
Τι ώρα πηγαίνετε για ύπνο;/ What time do you go to sleep?		
Πόσες ώρες εργάζεστε καθημερινά;/ How many hours do you work daily?		
Είναι η ζωή σας αγχωτική ή τεταμένη;/Is your life tense or stressful?		

Άσκηση / Excercise	Ύπαρξη/ Occurrence	Συχνότητα/ Frecuency
Yoga/Pilates ή παρόμοιες δραστηριότητες/ Yoga/Pilates or similar activities		
Προπόνηση αντίστασης ή βάρη / Resistance training or weights		
Αερόβια άσκηση (π.χ. τρέξιμο, κολύμπι, ποδηλασία, ποδόσφαιρο, τένις,...)/ Aerobic exercise (e.g. running, swimming, cycling, football, tennis...)		
Πόσες φορές προπονείστε την εβδομάδα;/ How many times do you train per week?		
Πόσες φορές προπονείστε την ημέρα; / How many times do you train per day?		
Πόσες ώρες προπονείστε την ημέρα; / How many hours do you train per day?		
Εάν είσαστε σε αγωνιστικό τμήμα συμπληρώστε επιπλέον τα δυο παρακάτω ερωτήματα: If you are in a competitive section, please fill in the following two questions:		
Πόσους μήνες διαρκούν οι αγώνες;/ How many months do the matches last?		
Πόσους αγώνες έχετε την εβδομάδα;/ How many matches to you play per week?		
Διατροφή/ Diet	**Ύπαρξη/ Occurrence**	Συχνότητα/ Frecuency
Θεωρείτε ότι η διατροφή σας είναι ισορροπημένη/υγιεινή;/ Do you consider your diet to be balanced/healthy?		
Ακολουθείτε μεσογειακή διατροφή;/ Do you follow a Mediterranean diet?		
Καταναλώνεται κόκκινο κρέας; (φορές ανά εβδομάδα) Do you consume red meat? (times per week)		
Καταναλώνεται γάλα και γαλακτοκομικά προϊόντα; / (φορές ανά εβδομάδα) Do you consume milk/dairy products? (times per week)		
Καταναλώνεται επεξεργασμένα τρόφιμα;/ (φορές ανά εβδομάδα) Do you consume processed food? (times per week)		
Καταναλώνεται καφέ ή ροφήματα με καφεΐνη; (φλιτζάνια/ημέρα)/ Do you consume coffee or caffeinated beverages? (cups/day)		
Πόσα ποτήρια νερό πίνεται την ημέρα;/ How many glasses of water do you drink daily?		
Κάπνισμα*/Smoking*	**Ύπαρξη/ Occurrence**	Συχνότητα/ Frecuency
Καπνιστής συμβατικού τσιγάρου/Conventional cigarette smoker		
Πόσα έτη / Τσιγάρα (ημέρα) How many years / Cigarettes (day)		/
Πρώην καπνιστής / Former smoker		
Πόσα έτη / Τσιγάρα (ημέρα) How many years / Cigarettes (day)		/
Καπνιστής ηλεκτρονικού τσιγάρου/ Electronic cigarette smoker		
Πόσα έτη / Τσιγάρα (ημέρα) How many years / Cigarettes (day)		/
Αλκοόλ/ Alcohol		
Είδος αλκοολούχων ποτών/ Kind of alcoholic beverage		
Πόσα έτη / Αριθμός ποτών (ημέρα) How many years / Number of drinks (day)		
Χρήση εξαρτησιογόνων ουσιών ** / Use of addictive substances **		
Παρούσα χρήση ναρκωτικών ή ουσίας/ Current use of drugs or substances		
Παρελθοντική χρήση; / Past use?		

**Προσωπική εκτίμηση ετών καπνίσματος και κατά μέσο όρο αριθμού τσιγάρων / Personal estimate of years of smoking and average number of cigarettes*
*** Συστηματική χρήση σε βενζοδιαζεπίνες, οπιούχα, κάνναβη, κοκαΐνη, αμφεταμίνες/ Systemic use of benzodiazepines, opiates, cannabis, cocaine, amphetamines*

Χορήγηση συμπληρωμάτων διατροφής ή διαιτητικών προϊόντων/ Administration of nutritional supplements or dietary products

	Ημερομηνία/Date***		
Σκεύασμα/Formulation	Έναρξη/Start	Λήξη/End	Δόση/Dose (mg)

**** Κατά προσέγγιση εκτίμηση εάν δεν έχετε καταγράψει ημερομηνίες / Approximate estimate if no dates recorded*

Examinees receive a full report of analysis & results on their biological age & impact of their lifestyle

Telomeres

Chromosomal telomeres are essentially repetitive nucleotide sequences located at the distal ends of linear chromosomes in eukaryotic cells. Their role is to preserve genetic information, while helping maintain chromosome structure, shielding them from deconstruction, recombination and fusion. The length of telomere ends fluctuates depending on age, cell type, the health state of each patient and their habits. With time and after every cycle of cell division, the length of chromosomal telomeres shortens, until it reaches a crucial threshold (Hayflick limit), where mechanisms of cell DNA repair are activated, which lead the cell to aging and apoptosis.

Telomeres as a biomarker of biological age

The term biological age is used to describe the age of the patient under examination, as indicated by the length of their telomere ends, specifically by evaluating the index of short and crucially short telomere (telomere ends which have reached the Hayflick limit.)

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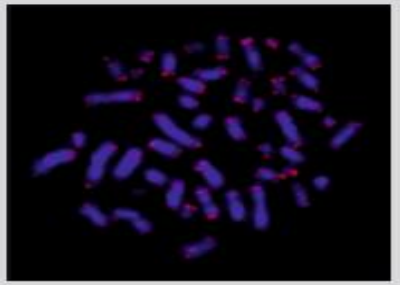
Patient details

Patient code :

Name:

Date of birth:

Gender:

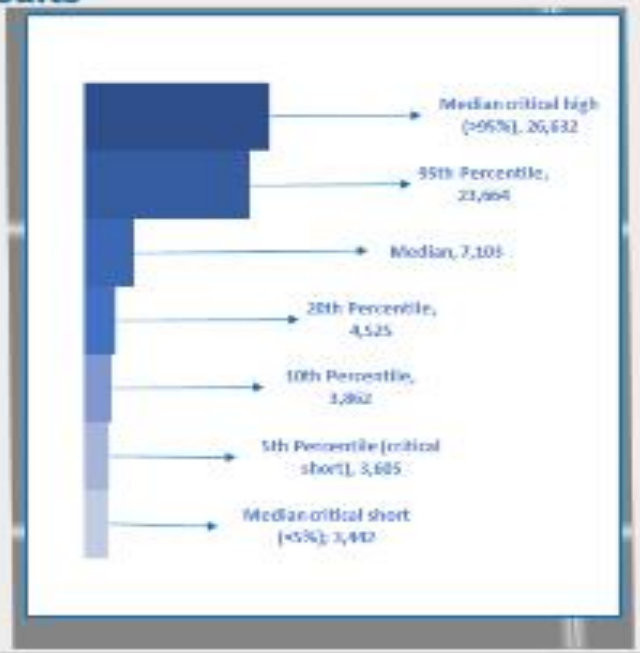


Your image of telomere fluorescence by using Q-FISH metaphase method (blue: chromosomes, red: telomeres)

Telomere length measurement

Telomere length measurement was achieved by utilizing metaphase Q-FISH method. After processing the trace amount of blood that has been initially collected, metaphase cells were isolated and hybridized using a fluorescent detector. Lastly, photo stills of metaphase cells were taken, so that the sample can be karyotypically analyzed. This analysis was done using high technology equipment, which include a fluorescent microscope and telomere ends measuring software.

Telomere results



- The mean value ± standard deviation (mean ± SD) of telomere length is 8.976 ± 6.053 nucleotide bases.
- The median value (m) for telomere length for the subject total is m=7.103 nucleotide bases with an interquartile range (IQR) of IQR=4.709-10.849 nucleotide bases. Critical long telomeres (>95%) was set at 26.632 nucleotide bases.
- The upper limit of short telomeres (20th percentile was 4.525 nucleotide bases. Median telomere length of short telomeres was 3.862 nucleotide bases. Critical short telomeres (<5%) was set at 3.605 nucleotide bases, while the median of critical short was 3.442 nucleotide bases. %Percentage of telomeres <3000 bases) was 0.0%

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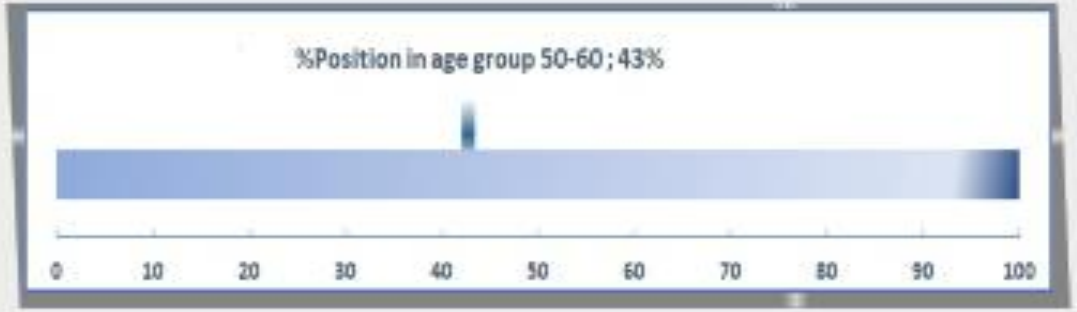
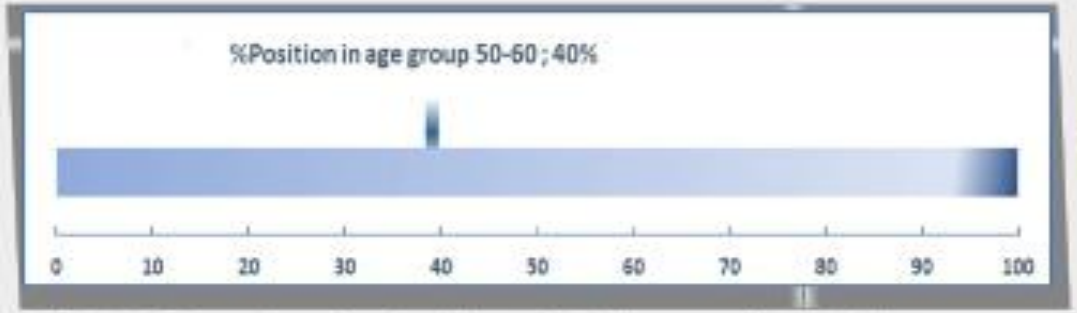
1. Patient telomere length compare to population



(A)

%Position: Relative positiono of your telomere length in the age population distribution (whole sample).



(B)

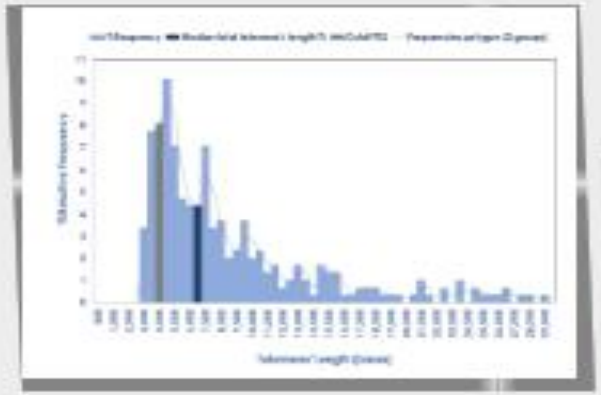
%Position: Relative positiono of your short telomere length in the age population distribution

(A) Telomere's Length of the whole telomeres showed a median of 7.103 nucleotide bases, and its relative position was in the 43th percentile of the age distribution 50-60 years

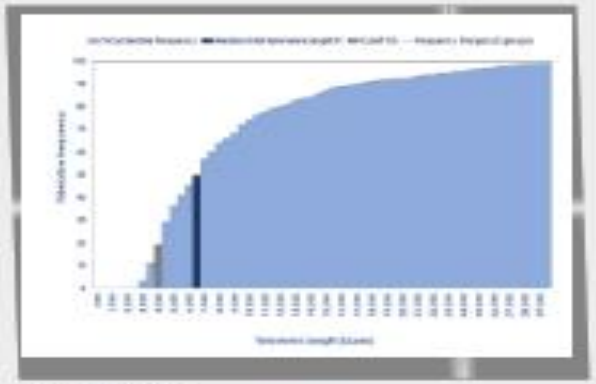
(B) Telomere's Length of the short telomeres (20th percentile) showed a value of 4.525 nucleotide bases, and its relative position was in the 40th percentile of the age distribution 50-60 years

Relative position was based on the present data integration

2. Telomere ends length distribution histogram



(A) Simple



(B) Cumulative

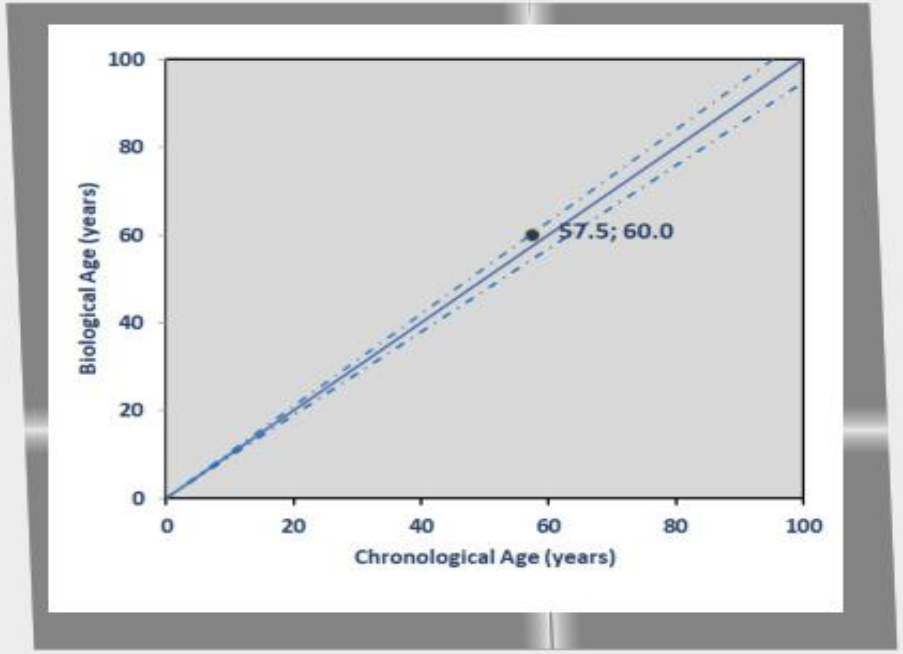
These histograms show the distribution of telomere length. "Blue" bar indicates the median value for telomeres total and "grey" bar the upper limit of short telomeres (20th percentile of the whole sample

3. Patient's measurements compare to population and population group

In the diagram above the critical individual and population data for telomere length TL are shown. The median length of the total and the short telomeres is lower that the corresponding age population's values.

Population data are based on current data integration imported in the LifePlus® database. (m: Median telomere length value)

4. Biological age



A) Your biological age is **60.0 years.**
Biological age is larger than chronological age **60.0 > 57.5** years by 2.5 years in absolute values

Biological age was estimated on the population distribution of short telomeres based on the present integration data of LifePlus

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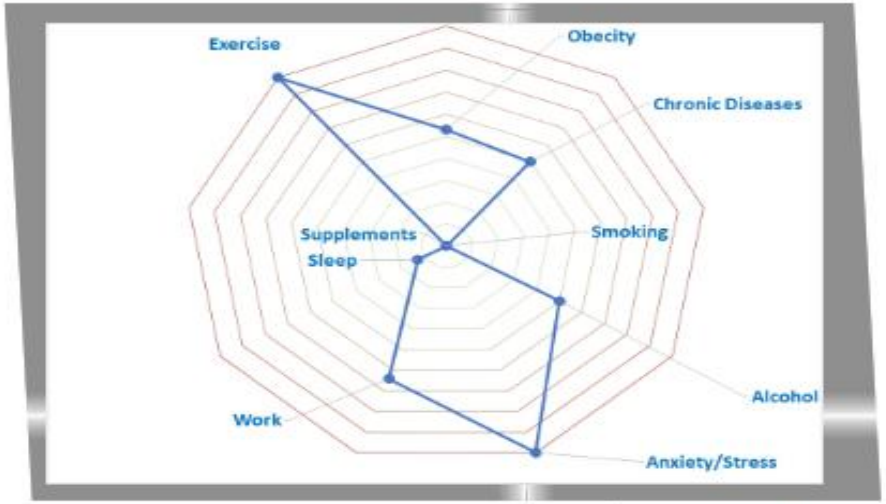
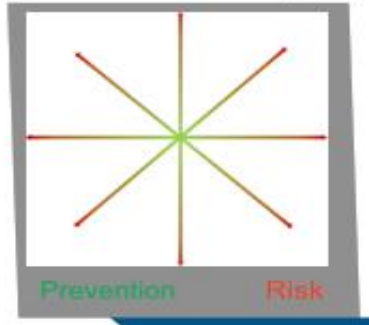
5 Risk and prevention factors



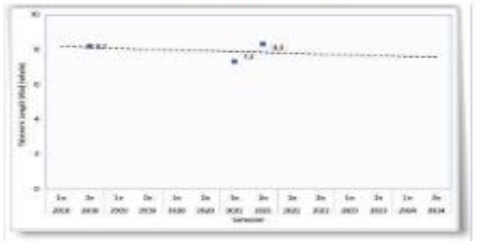


Individual's profile of risks and beneficial effects of factors related to telomeric length (based on your questionnaire).

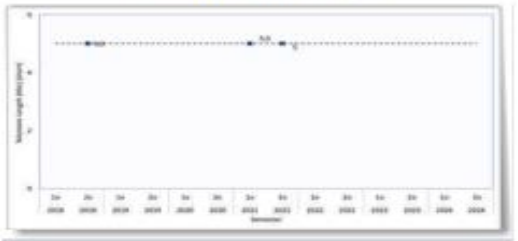
6. Differential change of telomere length

These graphs show the historical evolution of your results.
Each point represents the result of each of the telomere tests you have previously undergone.

Total telomere lenght



Short telomere lenght



Differential change of telomere length is possible only in the case of consecutive measurements.

Conclusion

The mean value of your telomere length is 9.500 nucleotide bases.
The median value for telomere length for the subject total is 8.970 nucleotide bases and it is within the normal range (20-80%) of the population distribution for the age group 50-60 years old.
The median value of short telomeres is 5.315 nucleotide bases and it is within the lower range (5-20%) of the population distribution for the age group of 50-60 years of chronological age.
Biological age was calculated at 52,8 years.

It is recommended to monitor your telomere length every year, although periods of 6 months are often sufficient to detect changes in telomere length.

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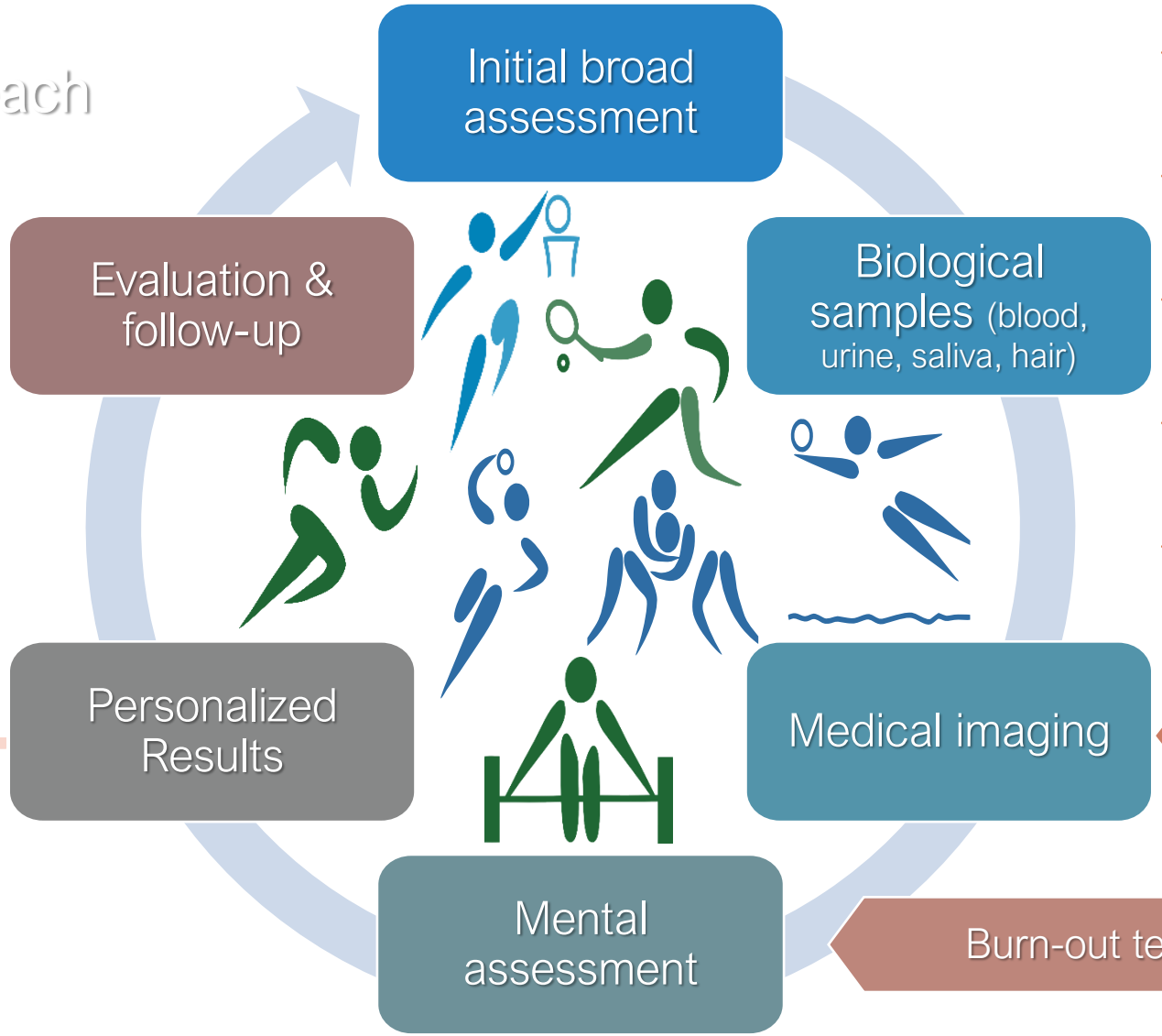

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- Genotype/Phenotype
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- Essential elements
- Echocardiography
- Burn-out test

- Cellular aging
- Genetic traits
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Scientific Achievements *(till today)*:

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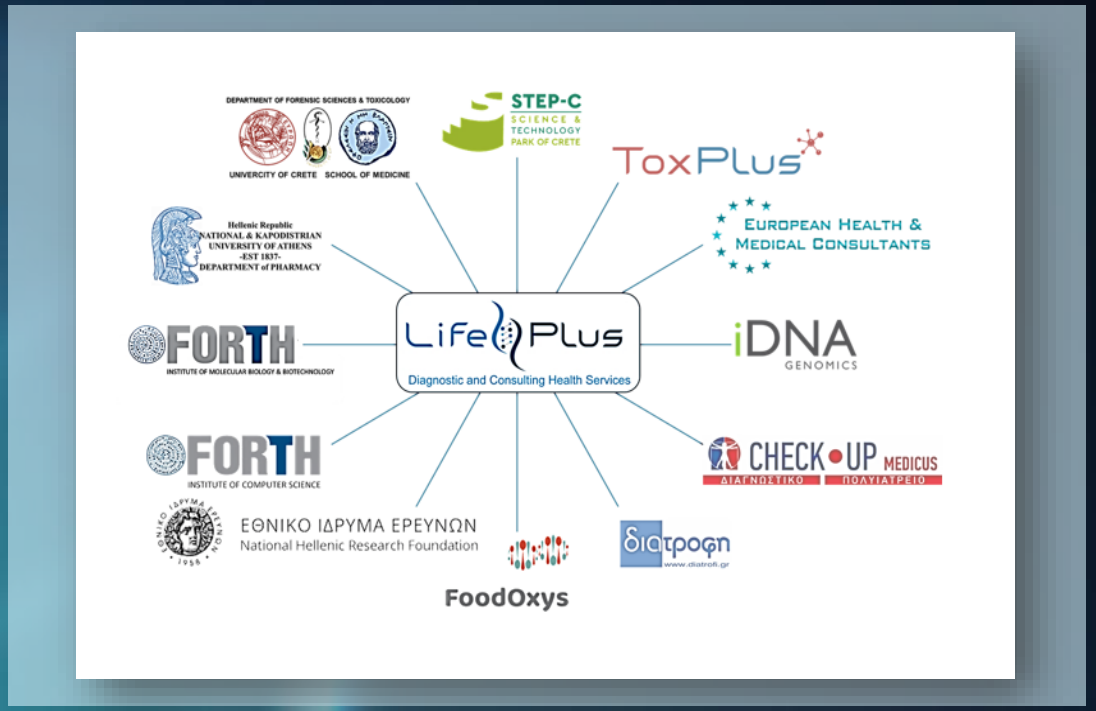

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