Anti-Ageing Medicine

5. Norske Kongressen i Geriatri
Gamle Logen, Oslo 23 April 2013
Preliminary Remarks

..the world has changed...
...ageing and the older person have changed...

..so what about geriatric medicine?

Reality-check:
4 illustrative snapshots of change

1. Global longevity..
2. Lifestyles..
3. Generation effect…
4. Changes in medicine…
2. Changes in lifestyles, choices and rights: New ‘norms’ about life and of the body image concept...

Last Century
...standards & norms...

This Century
...multiple life course & ageing choices...

Growing Old Is Not For Sissies
3. Generation effect ....Baby-boomer effect

→ new quests and medical demands... of which anti-ageing medicine...

and their ageing fans...
JUNKIES NEVER DIE, THEY GO INTO RETIREMENT HOME

The Time Independant, London, Nov. 1998

“[...] A proposal from the Rotterdam Junkiebond, the drug addicts' union, was accepted by the municipal health authority who agreed to finance an old folks home, devoted exclusively to drug users. It is not on to integrate the junkies with ordinary senior citizens because they might have difficulty finding acceptance. "Most elderly people would tolerate a person taking a drink or smoking a cigarette, but just one gram of heroin in an old people's home and they would want you out."
4. Changes in Medicine: The Technological Revolution

... causes, processes, protocols, treatment, monitoring and care

Changes in geriatric medicine....?
Digital pills make their way to market

30 Jul 2012 | 21:31 BST | Posted by Amy Maxmen | Category: Biology & Biotechnology

Digestive microchips embedded in drugs may soon tell doctors whether a patient is taking their medications as prescribed. These sensors are the first ingestible devices approved by the U.S. Food and Drug Administration (FDA). To some, they signify the beginning of an era in digital medicine.

"About half of all people don’t take medications like they’re supposed to," says Eric Topol, director of the Scripps Translational Science Institute in La Jolla, California. "This device could be a solution to that problem, so that doctors can know when to rev up a patient’s medication adherence." Topol is not affiliated with the company that manufactures the device, Proteus Digital Health in Redwood City, California, but he embraces the sensor’s futuristic appeal, saying, "It’s

The era of digital medicine just got one step closer to reality. The U.S. Food and Drug Administration (FDA) has for the first time approved a digestible device — a sand-particle sized microchip that can be embedded in drugs to monitor patients’ response to treatment, according to a new report in *Nature*. The device is currently only approved for use with placebos but Proteus Digital Health, which is developing the technology, hopes approval with other drugs will be forthcoming in the near future. Co-founder and chief medical officer for Proteus George Savage tells *Nature* the enhanced pills could be used to treat everything from drug-resistant tuberculosis to diabetes.

"The point is not for doctors to castigate people, but to understand how people are responding to treatments," Savage tells *Nature*. "This way doctors can prescribe a different dose or a different medicine if they learn that it’s not being taken appropriately."
Paradox of 2 realities

Ageing versus ‘enhanced longevity’ ...

- N of old persons ➔ very old (80+)
- % of old persons
- life expectancy (faible indicateur)
- Longevity and exceptional longevity

- Number of generations living together
the biggest ever generation ➔ Baby-Boomer!

The more you age and the more you see technology, biotechnology, engineered body bioactive nutrition in the body…

- of technology and modified ageing bodies!

Technologisation and commercialisation of longevity, of medicine and anti-ageing medicine
Evolution towards new concepts of life, of ageing
Innovation in Life Sciences and future life options....

Personalized life → personalized medicine
Life Long pre-prevention → Longevity medicine
Evolution of the Science of Ageing

From traditional ageing to anti-ageing
Ageing concept: a scientific work in progress….

1950s: **Ageing as a natural decline** – pathological ageing is ‘normal’
  - Negative ageing & Irreversible degeneration

  **Medicine**: Geriatric Medicine - curative and palliative

1980s: **“Successful Ageing”** - Healthy ageing is possible +gain/loss
  - Positive ageing and slow down process

  **Medicine**: Preventive medicine, healthy & Active Ageing

1990-2000: **Biogerontology & Anti-Ageing** – pathological ageing is not ‘normal’
  - Healthy & active longevity - long life peak performance

  **Medicine**: Anti-ageing medicine, functional and metabolic medicine
Examples of in(de/re)capacities: Prevent degeneration, improve functionality & physical capacity

**Vision**

US scientists have developed a "bionic eye" (2007) ➔ Second Sight sold 2011

Retinal Implant
Boston project

**Intelligent soft contact lense (wifi)**
Measures pressure pt –ttt glaucoma

**Dentistry** = functionality linked to chewing, oral hygiene, smiling, sexuality, self-esteem, sociability

**Oral health** linked to cardio-vascular disease, **silent infections** (i.e. new findings for Alzheimer, Parkinson etc)

**Audition – e-audition**
➔ communication, socialisation avoiding isolation

**Artificial organs & implants** = renewed functions
« The heart on the shelve » in the supermarket...

Result

Improving functionality and quality of life
slowing down, postponing or restoring
at all ages the ‘incapacitation process’
Multi-modelling of the ageing process

Rapid advances in science & technology
...can create innovation ignorance and neglect....
Examples:
  Brain-Neurone regeneration
  Nutrition – gut health = 2nd brain (> neurones)

Non pathological

Successful Ageing
Low risk of disease
High Autonomy

Usual Aging – frail elderly
High risk of diseases
non pathologic

Generalisation ➔ Stigma/Discrimination ➔ prejudice on reversibility

Pathological ageing and frailty
Effects of disease, deterioration, deficits, infections...
on the physical, mental or sensorial capacity

Super Ageing/Anti-ageing
Optimal state
peak performance to the end
Bionic ageing

Aging Process

Norm? Pathology? Health?
What is Anti-Ageing Medicine?
Survey Design
TA-Swiss Study

- Swiss Centre for Technology Assessment - www.ta-swiss.ch
- Swiss Academy of Medical Science
- Federal Departement of education and technology
- Editor: University of Zurich Engineer School

C. Impact-Consequence

Population health
- Longevity
- Healthy Life Expectancy
- Quality of Life (subj/obj.)
- Risks (long/short term)

Policy implications
- Quality control
- Legislation

Ethical Issues

Scientific, Practice and Policy Recommendations

Situation – state of art

a. What is AAM?
  - Definitions
  - Concept of ageing & medicine
  - Movement AAM pro-cons
  - Place in Medicine and Society

b. What works or not? What is practiced, how?
  - Known mechanisms
  - Areas of prevention, intervention and treatment
  - Evidence: what works or not?
  - Grey zone
  - Beyond medicine….
  - Use and abuse

• Swiss Centre for Technology Assessment - www.ta-swiss.ch
• Swiss Academy of Medical Science
• Federal Departement of education and technology
• Editor: University of Zurich Engineer School
What is Anti-Ageing Medicine? Definition & concept

« Anti-aging interventions, known as anti-aging medicine are measures to slow, arrest, and reverse phenomena associated with aging and to extend the human life span »


Concept → Guiding Principles

- If degeneration = Intervene on the degeneration mechanisms
- If depleted energy = Boost the system, ‘doping’/’enhancing (peak performance)
- If broken = Restore or Replace the ‘body parts’
- If unused = Reactivate, regenerate, enhance…
- If unusable = Engineer it… re-create the missing chain a reality. i-monitor..
- If needs aid = Technologize your body or the assistance/aid – Assistive devices
- If needs care = e-care, auto-care, robotize inside, outside and inside-out
The Origin: a rebellion against geriatricians’s views of ageing

OBJECTIVES

- Life extension and quality of life optimization → best life possible
- High tech prevention, check ups and interventions → Early detection of body failure → Micro screening and monitoring

Dr Robert Goldman

Dr Ronald Katz

Swiss Society for Anti-ageing Medicine & Prevention
Swiss Academy of Anti-ageing Medicine
Schweizerische Arbeitsgruppe für Better ageing
Swiss-Austrian Association for Anti-ageing Medicine

www.worldhealth.net

Joined A4M
What the Doctor Takes?
Dr Klatz, President A4M

http://www.worldhealthnet.tv/video/what-the-doctor-takes
Rules of A4M

So, the 3 rules of anti-ageing medicine:

1. Rule one, don’t get sick
2. Rule two, don’t get old
3. Rule three, don’t die

If rule 3 happens, forget 1 and 2
A New Paradigm = countering decline and human enhancement:
Ageing, Better ageing or Anti-ageing a question of choice or of deviation from the « Norm »?

A. Traditional ageing:
   Irreversible decline
   ‘natural ageing’

B. Better ageing:
   active / healthy ageing
   ‘successful ageing’

C. Anti-ageing:
   Early prevention and intervention
   ‘human enhancement’

Life long Strategies:
early detection and intervention

Forgotten parameter 1: homeostasis → imbalance and deficit timing processes
ex: serum, blood, urine and stools sample analysis....not the same result and timing
not the same assimilation, distribution and elimination according to time of day...

Homeostasis of the system is ‘getting more easily imbalance with age
Return to the “point 0” and to health is longer and more difficult....

Diverse parameters

Limit - superior

Limit inferior

→ new medicine attitude/practice= anticipating, ‘human enhancement’ ‘and anti-ageing’
measuring → responding = boost, regulate and reverses those imbalances and deficits
Forgotten parameters 2: Life course cumulation
Forgotten parameter 3: reversibility process

Example of Diabetes Type II or osteoporosis: > 10 years to develop
→ early detection → personalized intervention → reduced costs

Pathological Symptoms
Diabetes is declared = sick

Renal failure, blindness, amputation, metabolic problems

Glycemia levels high

Normal

Normal
Areas covered by high tech anti-ageing medicine: (Stuckelberger, 2010, 2012)

**High Tech Medecine Anti-Âge**

- Resurfacing, remodeling
  - Dermatology
  - Phlebolgy
  - Laser, etc

- Cosmetic Esthetic
  - ‘Appearance Medicine’

- Vitamin Supplements
  - Medicinal Herbs

- Brain Enhancement
  - Training memory/cognitive
  - Mood Enhancement
  - Brain Food

- Lifestyle Fitness/Sport Wellness

- Human Enhancement
  - Sport Medicine
  - Doping all ages

- Surgery
  - Bio-surgery
  - Cellular therapy
  - Transplantation
  - Prosthetic/implants
  - Esthetic, etc
  - Neuro-engineering

- High tech Treatment
  - Laser, biostimulation, lampflash, frequencies, etc

- Detection and monitoring
  - Devices & implants
  - (glycémie, HTA, diabète, etc)

- Bio-ingeneered Bionique
  - Replacing Spare Parts

- Specialized Medicine
  - Regenerative medicine
  - ‘Longevity medicine’
  - Cosmetic medicine
  - Cardiologist
  - Dermatologist
  - Orthopedist
  - Angiologist
  - Opthalmologist
  - Dentist, etc.

- Medication
  - Care, treat, regenerate
  - (ex.: osteoporosis)

- Nutrition Alicaments
  - Nutrigenomic
  - Cosmeceutical

- Robotics
  - Neurronics
  - Exosqueleton
  - ‘Smart House’

- Neuro-engineering

- Pharmacological
  - Medication

- Endocrinology
- Gynecology

- Biomolecular
  - et cellular
  - Stem cells
  - (adults and umbilical cord), genetics, etc.

- High tech Treatment
  - Ageing Biomarkers
  - Laser, biostimulation, lampflash, frequencies, etc
What professions are involved?

Medical Specialties in Anti-Aging

- Gynecologists
- Surgeons
- Dermatologists
- General practitioners and internists
- Family doctors
- Endocrinologists

...and many more growing new fields...
- Women/Men medicine (menopause/andropause)
- Metabolic medicine
- Nutrition medicine
- Cosmétique medicine
- Body contouring medicine
- Lifestyle coach, SPA & wellness, neurocosmetics, etc

A vast network of ‘support’

- Pharmacists – Compound pharmacies
- Laboratories with specific offers for AA
- Genetic testing laboratories
- Manufacturers: medical and surgical equipment
- ‘Hardware’ (machines, lasers, etc etc)
- Food industry + nutrition and supplement companies
- Para-medical and non-medical practitioners
- Hotel package accommodation SPA Wellness
- Beauty & cosmetic industry
- Pharmaceutical industry
- Scientific and other publications
- Curriculum for health practitioners
- New business opportunities
Revolution: (bio) technological transfer to the human
## Anti-ageing Interventions

### I. INTERNAL INTERVENTIONS

- Caloric Restriction
- Stem Cell and Cell Therapy
- Genetics, Genomics, Proteomics
- Peptides
- Hormones
  - Growth Hormone (GH)
  - DHEA – Dehydroepiandrostérone
  - Feminine hormones: HRT = Horm Replac
  - Masculine hormones = Testostérone
  - Melatonine
  - Ocytocine
- Statines = Cardio-vascular protection
- Strontium Ranelate = Rebuilding bone density
- Sexual Life Enhancement = viagra and Cialis
- Neurostimulators = Nutrition/supplements e.g. Gingko Biloba
- Chelation Therapy = Heavy Metals Detox’
- Nutrition and Nutritional Supplements
- Nutrigenomics – Cos
- Natural plants & Her

### Pharmacologiques

- Peptides
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### II. EXTERNAL INTERVENTIONS

**Surgery and Human Enhancement**

- Aesthetic surgery and laser
  - Face %& Body regeneration
  - Skin = wrinkles and scars
  - Ageing spots
- Fat and Cellulite
  - Nice legs
- Hair: too little or too much
  - Body Beauty
  - Body Countouring
  - Body Lift
  - Bariatric Surgery
  - Genital organs lift and reshaping
- Engineering the body (implants, protheses and bionic body parts, exosqueleton)
- Future self-monitoring (i.e. HTA, Diabetes)
- Physical Activites for the body, brain peak performance
- Sleeping well
- Environmental detoxification and prevention

### FUNCTIONAL INTERVENTIONS

- Sensory motor check up
- From Teeth to Toes
- Organ functions (i.e. acid/base in stomach)
- Brain = rebuilding those neurones…. 
7 recommandations for Policy
Anti-Ageing Medicine and Practice
*TA-Swiss Study, Stuckelberger, 2008*

**Consumer’s Safety and Information**
1. High-Risk AAM Manufactured Products/Devices *(bio-psycho-financial abuses)*
2. Non-Medical Practice of AAM Interventions *(laser, flashlamps, high tech devices)*

**Research, Knowledge Transfer, and ‘Ethiceuticals’**
3. Insufficient/non adjusted Scientific Research and Data *(bioequivalence, age, sex)*
4. Scientific and Ethical Guidelines on AAM Interventions
5. Double Standard Research & Development: Danger of a Market-Driven Scientific Development

**Improving Prevention and the Health System**
7. Need for Multidimensional Prevention
Differences in Interventions Prevention, Cure and Care: Better Ageing vs High Tech Medicine

‘Geriatric medicine’
Based on solid evidence and averages

PREVENTION - INTERVENTION
 PREVENTIVE SCREENING
 MULTIDISCIPLINARY ASSESSMENT
 HOME INTERVENTIONS
 COMBINING PREVENTIVE MEASURES
  nutrition, physical, mental, social activity, lifestyles

CURE - THERAPY
 POLYMORBIDITY - POLYMEDICATION
 REHABILITATION PHYSICAL-MENTAL

CARE
 MAINTENANCE CARE: Medication & rehabilitation
 PALLIATIVE CARE

Application of what is absolutely safe according to standards of care

STANDARDIZED PUBLIC HEALTH

‘Anti-Ageing Medicine’
Based on experimental, biotech/engineering research or clinical cases

PREVENTION - INTERVENTION
 PRE-PREVENTIVE = EARLY DETECTION
 PREDICTIVE MEDICINE (Genetic pass, telomeres)
 BIOMARKERS (inflammation, oxidation, deficits, etc)

CURE & CARE = RECONSTITUTE
 BIOREGULATORS
 REGENERATIVE medicine to reconstruct, regenerate
 AGGRESSIVE REHABILITATION PHY-MENTAL
 SURGERY for restoration
 Cellular. Genetic. Calorific restriction (pill)
 Customized pharma, supplements and nutrition
 External Appearance Medicine
 Human Enhancement
 Smart Environnement (pension, alzheimer, etc.)
 Mobile Solutions (wireless and microchips)

Tailored-made Medicine
Biomedical and technological solutions
Level of Evidence linked to Areas covered by Anti-Ageing Medicine
(Stuckelberger, in press)

Level of certainty
For humans 100%

Human Specie

Cellular level  Animal level  Clinical trials  RCT Clinical Studies  Population Small … to global

AAM practice & products

Isolated Human cases Personalized?

Peer-reviewed articles

Ideal evolution of EBM
AAM treatment progressive …but at high risk..

AAM Intervention

EFFECTIVE

With side effects

No side effects

NOT EFFECTIVE

With side effects

No side effects

Cumulative negative factors:
- Dosage
- Intensity
- Pre-condition - Health profile
- Lack of age-specific testing
- Etc

(Stuckelberger, 2010, in press)
Concluding perspective

geriatric medicine
and
anti-ageing issues
Conclusion I: challenge for geriatric medicine

Technological and medical science are progressing very fast
R & D transfer to practice is also very fast

Geriatric medicine
Concentrates on pathological ageing → pathocentric
  a) with a palliative perspective
  b) with very little preventive medicine
  c) pathocentric view – often with decades of built-in idea of what is ageing
  how to treat it, but not how to prevent it or `reverse` it

Recommendations → revisiting geriatric medicine… and education in geriatric medicine?

- Need to deconstruct traditional views and prejudices
- Information transfer: updating new scientific findings from all fields -> adapt practices
  - Depression, brain regeneration, gut health (2nd brain), dormant infections, physical activation,
    nutrition/caloric restriction/suppl, redesign (home) care, prevention
- Geriatric medicine knows more …
  - neglected in pharma testing, differential ageing (e.g. men/women)
  - Front line for prevention/detection knowledge of cumulative ageing processes
- At the center: the right to patient to choose
Conclusion II
Challenge of anti-ageing medicine

Anti-Ageing Medicine
... is looking at reinforcing health, vigor and beauty
  a) with a human enhancement perspective
  b) with early detection and high tech screening
  c) with a salutogenesis approach
    - Different stages of life and generation
    - Different motivation and ‘way to do it’
    - Decline vs peak performance
    - Financing out of the pocket vs coverage
    - Huge market (medical business)
    - Not regulated vs very regulated

d) don’t know much about ageing and integrative processes

- Biomedicalization and technologisation of ageing
- Medicalisation of Business → Commercialisation of ageing
- Need continuous education with engineer, technicians and geriatricians
  (e.g. AAL assisted ambient living EU research projects)
Some illustrations of the paradigm shift in image
Longevity Interventions

1. Cellular level = Biomarkers
   - Stem Cell
   - Cell Therapy (Nyhans, MFIII)
   - Genetic therapy / Epigenetics
   - Genetic passports (predictis.com)
   - Life Length = telomeres

2. Hormones
   - Growth Hormone (GH)
   - DHEA – Dehydroepiandrosterone
   - Feminine: HRT/Masculine = Testosterone
   - Melatonine
   - Ocytocine
   - precursors of hormones: Zinc, Selenium, etc

3. Pharmacologiques
   - Statines = Cardio-vascular protection
   - Strontium Ranelate = Rebuilding bone
   - Sexual Life Enhancement = viagra, cialis
   - Neurostimulators = pharm + Suppl

4. Nutrition
   - Nutrition and Nutritional Supplements
   - Nutrigenomics – Cosmeceutics
   - Natural plants & Herbs

5. Functional interventions
   - Sensory motor check up
   - From Teeth to Toes
   - Organ functions (i.e. acid/base)
   - Brain = rebuilding those neurones....

6. Aesthetic Medicine
   - Face & Body regeneration
   - Skin = wrinkles and scars
   - Ageing spots
   - Fat and Cellulite
   - Nice legs
   - Hair: too little or too much

7. Plastic and reconstructive surgery
   - face, lippo, breast
   - Body Countouring
   - Body Lift
   - Bariatric Surgery
   - Genital organs lift and reshaping

8. Engeneering the body
   - Implants, protheses, bionic parts, exoskeleton
   - Future self-monitoring (i.e. HTA, Diabetes)
   - Physical Activites → body + brain performance
   - Sleeping well
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Longevity Interventions

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Example: Genetic passport and Telomere Measures
Caloric Restriction: undisputable scientific results on longevity and health
(NIA, University of Wisconsin)

L’étude de la NIA (National Institute on ageing), publiée dans le journal Science en 2009, relate ses débuts en 1989 avec 30 singes adultes + 46 en 1994
\[ N = 38 \text{ RC et Nctrl} = 38 \]

Quelques données de l’étude:
- Les singes survivants de l’étude sont actuellement âgés d’au moins 27 ans. Les résultats montrent
  - Singes RC = baisse drastique le niveau de leurs cancers, diabètes, maladies cardio-vasculaires, atrophies cérébrales et perte musculaire.
  - 50% de moins d’incidence des tumeurs cancéreuses et des maladies cardiovasculaires
  - aucun diabète, état pré-diabétique ou diabétique chez les RC comparé à 2% des singes qui mangeaient librement
  - mortalité : RC = 5/38 vs 14/38 groupe ctrl

« Nous savons maintenant que la restriction calorique marche pour une espèce proche de nous. Nous pouvons prouver les mécanismes et espérons les comprendre assez pour les moduler d’une manière ou d’une autre » affirme le Dr Ricki Colman, Université de Wisconsin. « La restriction calorique provoque des changements métaboliques dans le système de préservation de l’énergie, en activant les trajectoires métaboliques impliquées dans la régulation de la croissance et de la régulation des cellules. »
OKINAWA REGIME PYRAMIDE
An example of a low-calorie restriction regime

- Daily Tea
- Alcohol in moderation

Vegetable Oils and Condiments
(low-sodium soy sauce, miso paste,
Okinawan herbs and spices)
SPARINGLY, 1-2 TABLESPOONS

EAT DAILY

Fruit
2-4 SERVINGS

Flavonoid Foods
2-4 SERVINGS

Calcium Foods
2-4 SERVINGS

Vegetables
7-13 SERVINGS

Rice, Noodles,
Beans and Other
Whole Grains
7-13 SERVINGS

Omega-3 Foods
1-3 SERVINGS

Meat, Poultry
and Eggs
0-7 SERVINGS

Sweets
0-3 SERVINGS
Longevity Interventions

I. INTERNAL INTERVENTIONS

4. Nutrition
- Nutrition and Nutritional Supplements
- Anti-Cancer food, anti-cholesterol, etc.
- Nutrigenomics – Cosmeceutics
- Natural plants & Herbs

Nutrigenomics

ImmunoNutrition

Gut health, etc

ChronoNutrition

Food Drinks

Pharmacology

Supplement Bioactive agents
- Vitamines
- Minerals
- Anti-oxydants, etc.

Future: Peptides, Hormones, etc.
WHO/FAO Guidelines on Food Fortification with Micronutrients, 2006

Guidelines on food fortification with micronutrients
Edited by Lindsey Allen, Bruno de Benoist, Omar Dary and Richard Hurrell

FII and Partners
Second Technical Workshop on Wheat Flour Fortification: Practical Recommendations for National Application
March 30 to April 3, 2008

SUMMARY REPORT
The Flour Fortification Initiative
Second Technical Workshop on Wheat Flour Fortification: Practical Recommendations for National Application
March 30 to April 3, 2008
Stone Mountain, Georgia, USA

Second International Micronutrient Forum Meeting
Micronutrients, Health, and Development: Evidence-based Programs
Beijing, China, 12–15, May 2009
Example: 1: nutrition as a drug
- Is normal ageing = natural ageing = no intervention?
- Food is proven today to be at the basis of metabolic regeneration or regeneration
- Food is an ‘intervention’ on the body system!
- Modified food is a multiple intervention with multiple effects
- Why isn’t Nutrition a major course in medicine?

Example: 2
Drug affects OP Nutritional Status
Older persons over 65 years or older in the developing world consume ~30% of all medications. Average patient taking 3 to 7 medications at one time, 80+yo = up to 20
- Medications alter food intake, metabolism, nutrients absorption/excretion
- Decreases in appetite, taste and smell.
- May cause GI disturbances such as nausea, constipation, and/or diarrhea.

Example 3: caloric restriction as a treatment…

Absorption: Gastro-Intestinal Physiology
Assimilation, distribution, elimination….

- GI absorptive cells ↓
- GI motility ↓ or normal
- Sphincter activity ↓
- GI blood flow ↓
- Gastric acid secretion ↓
- Active transport ↓
Exemples de traitement pharmaceutique réversibilité spectaculaire de l’état d’ostéoporose

reconstruction de l’os et du cartilage en 6 mois = Strontium Ranelate

Design and methodology of the phase 3 trials for the clinical development of strontium ranelate in the treatment of women with postmenopausal osteoporosis

P.J. Meunier · J.Y. Reginster

Strontium Ranelate Increases Cartilage Matrix Formation

Y. HENROTIN,1 A. LABASSE,1 S.X. ZHENG,1 Ph. GALAIS,2 Y. TSOUDEROS,2 J.M. CRIELAARD,1 and J.Y. REGINSTER1
Longevity Interventions

I. INTERNAL INTERVENTIONS

2. Hormones
   - Growth Hormone (GH)
   - DHEA – Dehydroepiandrostérone
   - Feminine: HRT/Masculine = Testostérone
   - Melatónine
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   - precursors of hormones: Zinc, Selenium, etc.

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Hormone Replacement Therapy
Body Regulation through hormone management

**DHEA**
DeHydroEpiAndrosterone (DHEA) et son sulfatee (DHEAS) 4-8$/60 tab

**Growth Hormone**
100 mg = 2 bt = 360 $

**Melatonine**
3mg 14 Euro/120 tab

Many other hormones: Testosterone – Progesterone – etc…
Melatonine

Diverses études montrent:

- aide au sommeil (le plus argumenté mais encore controversé)
- médicament d’aide au mal de l’air et au décalage horaire
- medicament “scavenger” face aux radicaux libres
- anti-cancer
- stimulant immunitaire
- anti vieillissement (radicaux libres, stress et corticoïdes, déficit immunitaire, etc)

Un régulateur de la chronobiologie chez la PA : anti-depresseur, anti-mélancholie, etc

→ Un gros enjeu commercial

→ Peu de travaux randomisés, validés ; pas de label FDA ou autres garants d’expertise

Exemple de difficulté de fiabilité → mélatonine comme prévention de l’ostéoporose

- Travaux sur animaux et rythmes circadiens
- Melatonine inhibe le release de calcitonine, via l’hypophyse. Chez l’homme ?

- Difficile d’envisager le rôle de la mélatonine dans le traitement de l’ostéoporose face à l’efficacité des autres thérapeutiques

What about Cochrane Systematic Reviews?
Oxytocine

- Produit naturellement dans le cerveau durant les interactions sociales.
- Augmente les sentiments romantiques (et non directement sexuels).
- Aide les mères à l’attachement à leur bébé lorsqu’il y a un problème.
- L’hormone naturelle oxytocine qui est produite par le corps durant l’enfance et durant les relations sexuelles a été prouvée dans certaines études comme réduisant l’anxiété et les phobies.
- Après ces études convaincantes, les scientifiques sont déterminés à développer l’hormone dans un succès commercial en forme de spray nasal.

Médicament considéré par la MAA comme quasi-miraculeuse qui aide de nombreuses conditions à s’améliorer, inclus l’autisme, la dépression et l’anxiété et les troubles sexuels.


Paul Zak, Professeur de neuroscience au California's University déclare: ‘Les tests ont montré que l’oxytocine réduisait l’anxiété. C’est une hormone qui facilite le contact social entre les gens. C’est un produit sur qui n’a aucun effet secondaire et ne crée pas la dépendance.”
Melatonin for the prevention and treatment of jet lag

Hersheimer A, Petrie KJ

Published Online: July 8, 2009

Jet lag commonly affects air travellers who cross several time zones. It results from the body's internal rhythms being out of step with the day-night cycle at the destination. Melatonin is a pineal hormone that plays a central part in regulating bodily rhythms and has been used as a drug to re-align them with the outside world. Melatonin is remarkably effective in preventing or reducing jet lag, and occasional short-term use appears to be safe. It should be recommended to adult travellers flying across five or more time zones, particularly in an easterly direction, and especially if they have experienced jet lag on previous journeys. Travellers crossing 2-4 time zones can also use it if need be.
Neuro-enhancement & mental fitness
with soft doping, supplements and training

Oxytocin

Brain Food / Supplements
to produce serotonin, boost and enhance cognitive functions

Brain training

Brain Age

Méditation
Musique / Audiocaments
Recommandations
from the Swiss medical society of endocrinology
Longevity Interventions

1. INTERNAL INTERVENTIONS

2. Hormones
   - Hormones
     - Growth Hormone (GH)
     - DHEA – Dehydroepiandrostérone
     - Feminine: HRT/Masculine = Testostérone
     - Melatonine
     - Ocytocine
   - precursors of hormones: Zinc, Selenium, etc

3. Pharmacologiques
   - Statines = Cardio-vascular protection
   - Strontium Ranelate = Rebuilding bone
   - Sexual Life Enhancement = viagra cialis
   - Neurostimulators = pharm + Suppl
   - Chelation Therapy = Heavy Metals

4. Nutrition
   - Nutrition and Nutritional Supplements
   - Nutrigenomics – Cosmeceutics
   - Natural plants & Herbs

5. Functional interventions
   - Sensory motor check up
   - From Teeth to Toes
   - Organ functions (i.e. acid/base)
   - Brain = rebuilding those neurones....
Longevity Interventions

II. EXTERNAL INTERVENTIONS

6. Aesthetic Medicine
- Face & Body regeneration
- Skin = wrinkles and scars
- Ageing spots
- Fat and Cellulite
- Nice legs
- Hair: too little or too much

Photo: Dr Gábor Varadi

AVANT

APRÈS

Visage et mains avec taches de vieillesse :
à gauche avec taches, à droite après traitement pour supprimer les taches

Photos : Dr Maurice Adatto

Chirurgie classique : La solution de choix lorsque le status variqueux est important,
rendu complexe par des duplications du tronc de la veine saphène ou ses ramifications

Photos : Dr Jean-Pierre Bammatter

AVANT

APRÈS

Tâches de vieillesse : Différentes techniques existent telles que le laser ou la lumière basse pulsée (IPL) pour traiter efficacement des taches brunes et de la couperose

Photos : Patrick Michaud

Laser endovenues (ou laser des varices) : Intervention fiable, peu agressive, élégante, peu coûteuse.
qui peut être réalisée sans cicatrisation et sans arrêt de travail - 90% de bons résultats à 5 ans.

Dr Maurice Adatto
Anti-ageing through appearance enhancement

‘Changing norms’? The ‘feel good’ effect of subjective age vs objective age
Scientific effects on self-esteem, success and decrease of age discrimination!
Many medical interventions and regeneration works...
Dr Takusa Katsuya – Tokyo - model AAM doctor for AAM Clinic

I have undergone facial rejuvenation surgery on myself. The procedure was traditional face-lift with SMAS fixation, suspension of the neck and the cheeks and subcutaneous forehead dyssection with the anterior hairline incision. The frontal muscles were left untented. The skin incision was made in a braided fashion along the hairline of the frontal and temporal region. To further correct the elongated forehead, the hair-bearing skin excised in the postauricular region was recycled as single hair grafts, which were transplanted into dissected forehead skin at the same time. This made the scars inconspicuous and created a natural, youthful hairline. The outcome from these procedures was subtotal with the disappearance of the wrinkles and the firmness of the skin. For further rejuvenation and prevention of the reoccurrence, the removal of the buccal fat pad and gold thread instant in the jaw were performed. Phacial peel also contributed to the firmness of the skin. I have rejuvenated myself by 18 years. I will demonstrate all the rejuvenation procedures that I underwent and their outcomes.
if you don’t do anything....
Old models of ‘normal ageing’
Declining body: same Body mass index

Body mass index = index de Quételet
poids/taille$^2$ (kg/m$^2$)

Indice indirecte de la composition corporelle

BMI > 25 $\rightarrow$ surpoids

BMI > 30 $\rightarrow$ obésité
(~100+ kg pour 1.80m)
Reversal → Body shape gain: same Body mass index
Muscle enhancement: World Model of AA

Dr Bob Delmonte – 83 years old
The new trends
anti-aging medicine:
Bob Delmonteque 80yo &
Kelly Nelson 72yo California
Cultural differences in anti-ageing ‘peak performance’

Yuichiro Miura, 75 ans, Japon

Nouvelles générations d’alpinistes en course pour le titre du recordman le plus âgé sur le Mt Everest

Historique des records:
2000: Toshio Yamamoto 63 ans
2001: Sherman Bull, 64 ans
2002: Tomiyasu Ishikawa, 65 ans
2003: Yuichiro Miura, 70 ans
2006: Takao Arayama, 70 ans et 3 jours
2007: Katsusuke Yanagisawa, 71 ans et 63 jours
2008: Yuichiro Miura, 75 ans
2009: Min Bahadur Scherchan – 77 ans moins qlq jours

Yuichiro Miura, 75 ans en 2008?

S’entraîne dans sa chambre artificielle à bas oxygène, poids aux chevilles et sur son dos.
En 1970, 1er homme a avoir skié le Mt Everest, avec une chute vertigineuse à laquelle il a survécu
Live and age active and dynamic…..
Longevity record in sports and physical activity

Fauja Singh, 100yo, passed the finish line of the Marathon of Toronto in October 2011 in 8 hours – the oldest marathonien in the world

Gladys Burrill, 92yo started running at 86yo her first marathon – the oldest marathon women in the world
Dynamic in arts, science and more....
A few examples ..

Bertha Wood, born 1905 published her 1st book, a biography at 100 years old
“Fresh Air and Fun: The Story of a Blackpool Holiday Camp”

Rita Levi-Montalcini, 1909, very known scientist working on the nerve growth factor, is the first Nobel Prize to become centenarian

Daphne Selfe 81 yo is the oldest mannequin with 60 years of career stopped at 40yo and started again at 69yo for products such as Nivea and Olay.

Charin Yuthasastkosol, 1930 danced ballet at 71 yo for Thai ambassador
External interventions

Engineering the body….and body extension
Neuro-stimulators
Deep brain stimulation (DBS)
Decrease in Parkinson diseases tremor symptoms = quality of life
Neuro-engineering
such as neuro-implants, neuro-stimulators, ‘brain pacemakers’, biochirurgie,…

Application
with Parkinson disease, epilepsy, distoniae, depression, but also incontinence, functional regulation, etc

EU Research on bioengineering
See what I see — machines with mental muscle
Memory engineered, neuro-chips, etc
Ex. 5. from bio-technological to health monitoring
....on to the « self-quantifying movement »
The future of our Brain... food and electronics!

Projet EPFL Brain Mapping

Blue Brain Project dès 2005
« EU Human Brain Project »
Ecole polytechnique fédérale de Lausanne (EPFL, Suisse)

Le projet suisse « le CERN du cerveau », vise à décoder les principes du design du cerveau grâce au pouvoir de modélisation des technologies existantes, à l’image du décodage du génome humain – simuler le fonctionnement du cerveau ...

Le cerveau est une machine magique” déclare Henri Markam chef du projet
Japan: robotics for efficient living
HAL5, Hybrid Assistive Limb, la 5ème génération de costumes bioniques
Une nouvelle population de la Cybernique au Japon
Cyborg Generation
...good news for house cleaning
High Tech Rehabilitation in Switzerland

Aggressive physical rehabilitation programs
Sophisticated devices and technology developed to catalyze function-restoring rehabilitation, even years after injury

Locomat Pro®  Hocoma AG
robotic treadmill training
www.hocoma.com
The driven gait orthosis is a bilateral robotic orthosis with actuated hip and knee joints that is used for body-weight supported treadmill training.

Lünenburger et al. Journal of NeuroEngineering and Rehabilitation 2007 4:1
It’s a New World

Example

- New Biology---New Technology
- Genome Expression Microarrays
- Comparative Genomics
- Proteomics
- Bioinformatics, Computational Medicine, Evolutionary Biology and Biology of Ageing

Path to predictive, personalized, Preventive interventions and healthcare

Personalized life $\rightarrow$ personalized medicine
Life Long pre-prevention $\rightarrow$ Longevity public health
The new Geriatric patient of XXst Century?
Gero-Dynamic          Gero-Performant              Gero-Sexy
Thank you for your attention