# Vita CONNECT

Relevons les défis de l'agroalimentaire

## Thursday, April 4th, 2024

Vitagora®

Plus vite, plus loin. Ensemble.

# Tools and methodologies for meeting consumers' nutritional wants and needs

**Program: 4:30 - 5:30 pm**

- **From public health nutrition research to tailored nutrition counselling tool development** - Matthieu Maillot, CEO of MS-Nutrition
- **How to use research to meet infant's needs?** - Marion Lemaire, Nutrition Research Engineer at Sodiaal
- **Co-construction of personalised and specific nutritional solutions for vulnerable people** - Laure Lesage, Dysphagia Product Manager at Nutrisens
- **Using rice flour for dysphagia diet** - Kanae Ashida, Principal Scientist at Food Research Institute, NARO
- **Using collagen to meet the needs of active people** - Naira Adamyan, Co-founder of Welldrinks

# From public health nutrition research to tailored nutrition counselling tool development

Vita'Connect

Dijon, 4 Avril 2024

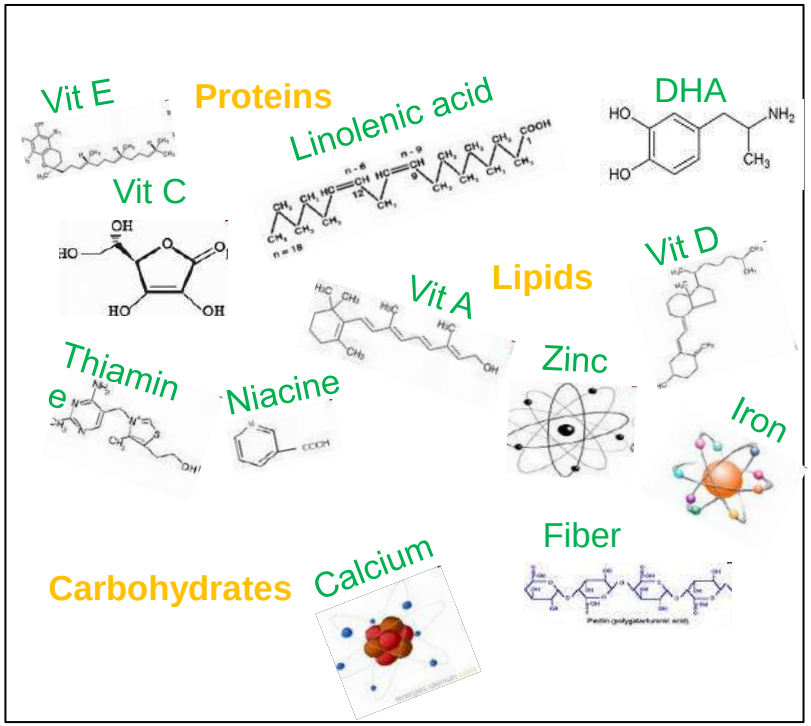
Matthieu Maillot. PhD
*Matthieu.maillot@ms-nutrition.com*

Florent Vieux. PhD
*florent.vieux@ms-nutrition.com*

# Nutritionist and dietician issue

## We eat FOODS…

## BUT We need nutrients




**=> Recommended dietary allowances**

**=> Maximum Recommended Values**
for saturated fats. free sugars. sodium

# Nutritionist and dietician issue

## We eat FOODS…

## BUT We need nutrients

**Recommendations on …**

-Macronutrients (proteins, carbs, lipids)
-Essential fatty acids (O3, O6, DHA; EPA)
-Fiber
-Vitamins
-Minerals
-<salt, sugar, SFA

**…population specific**

-Gender
-Age class
-Young children
-Pregnant women
-Senior
-Athlete

# Nutritionist and dietician issue

## We eat FOODS… BUT We need nutrients

**There is a need to translate**

**nutrients recommandations**

**into acceptable food choices**

**Recommendations on …**

-Macronutrients (proteins, carbs, lipids)

-Essential fatty acids (O3, O6, DHA; EPA)

iber

amins

nerals

sugar, SFA

**ion specific**

nder

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# Diet optimization was born to solve a problem related to nutrition

*Stigler*

How much of 77 foods should be eaten on a daily basis to ensure that a man meets the recommended amount for 9 essential nutrients with the cost of the diet being minimal?

*George Stigler. the cost of subsistence. 1945*

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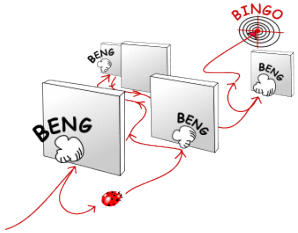


Stigler diet problem
Use of trial and errors method
**39.93$/year**

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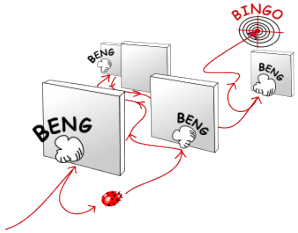


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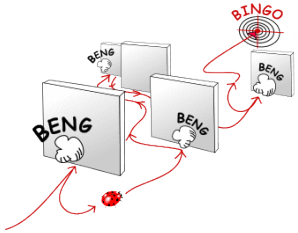


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Application of the simplex algorithm to the Stigler diet problem (Laderman. 1948)
**39.69$/year**

# Principle of diet optimization

1. Foods and Data =Variables

- List of 77 foods
- Nutritional composition (8 nutrients). energy. price

2. Targets = mathematical constraints

- On **nutrients**:

- nutrient-based recommendations RDA

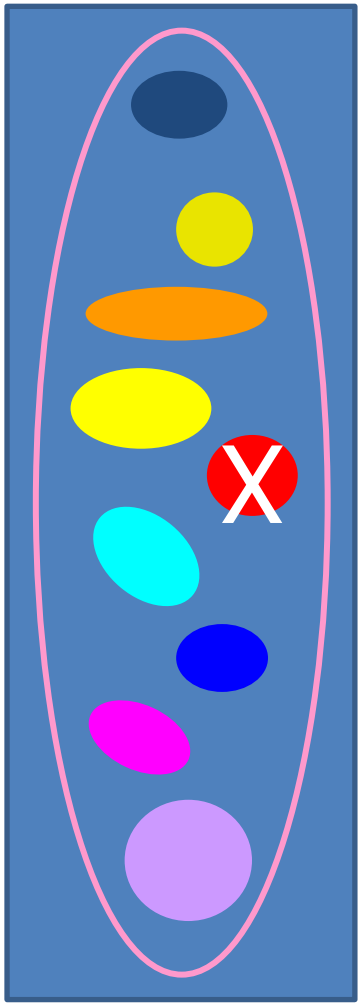
3. Specific question = objective function

Minimum Diet cost?

**4. OPTIMISATION**

selection of foods and their weight to achieve all constraints:

# Evolution of diet optimization in the 70's- Minimizing the departure from an existing diet



**Observed diet**

current average consumption of low-income Americans

**Variables**

**Consumed foods and their quantities,**
**New foods if needed**

**Constraints**

**Iso Energy**

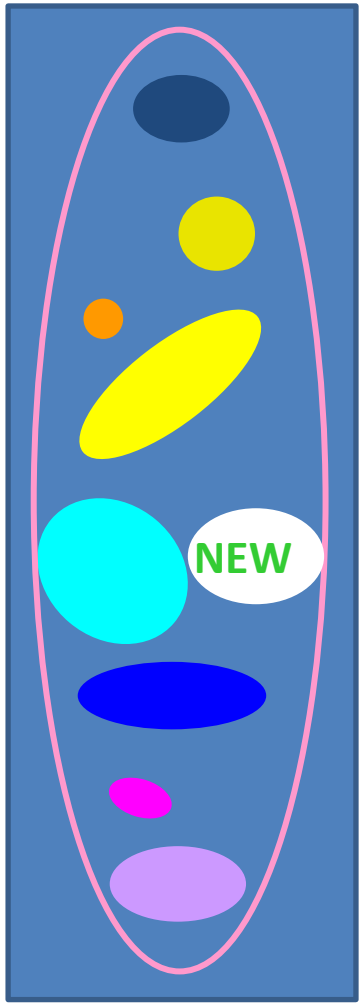
**Nutrient recommendations**

**Maximal quantities of foods and food groups, and max total diet weight**

**Cost, and/or any other food-related characteristic**

**Objective function & optimization**

**Minimal departure from the observed diet**




**Optimized diet**

nutritionnally adequate & socially acceptable

# Research questions in public health nutrition

- Feasibility of reaching a set of nutritional recommendations with a local food offer

Design of optimal food-based complementary feeding recommendations and identification of key "problem nutrients" using goal programming

***J Nutr 2006***

# Research questions in public health nutrition

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***J Nutr 2006***

- What is the lowest cost of a nutritionally adequate diet ?
- What are the dietary changes ?

Are the lowest-cost healthful food plans culturally and socially acceptable? ***PHN 2006***

# Research questions in public health nutrition

- Feasibility of reaching a set of nutritional recommendations with a local food offer

Design of optimal food-based complementary feeding recommendations and identification of key "problem nutrients" using goal programming ***J Nutr 2006***

- What is the lowest cost of a nutritionally adequate diet ?
- What are the dietary changes ?

Are the lowest-cost healthful food plans culturally and socially acceptable? ***PHN 2006***

- How low can environmental impact be reduced ?

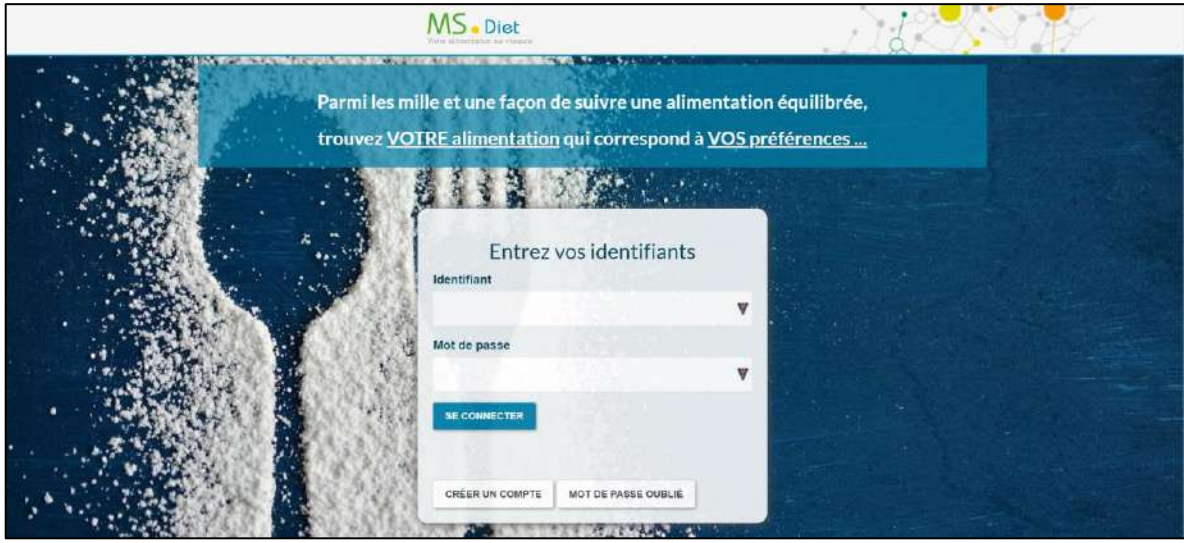
**How low can dietary greenhouse gas emissions be reduced without impairing nutritional adequacy, affordability and acceptability of the diet? A** ***PHN 2016***

# Application at the individual level

## For research program

## Within a web-tool

to help consumer to find dietary changes adapted to its dietary preferences



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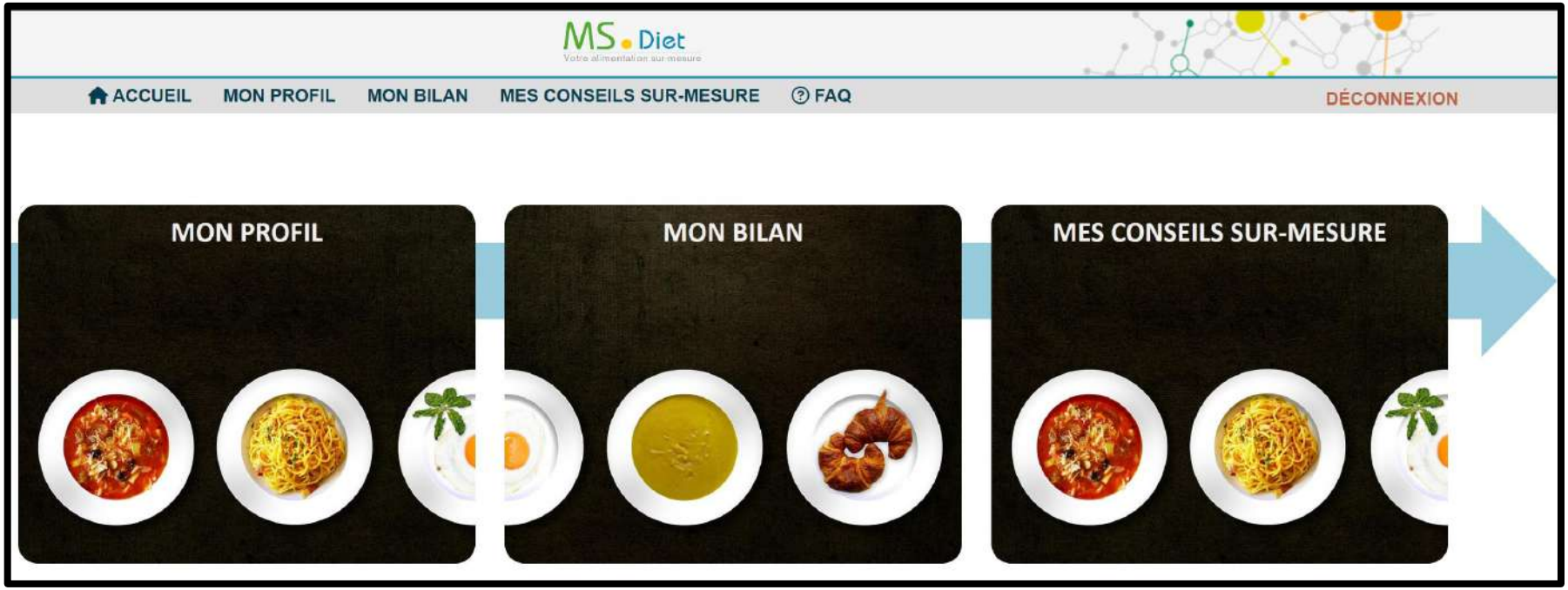


Online food questionnaire

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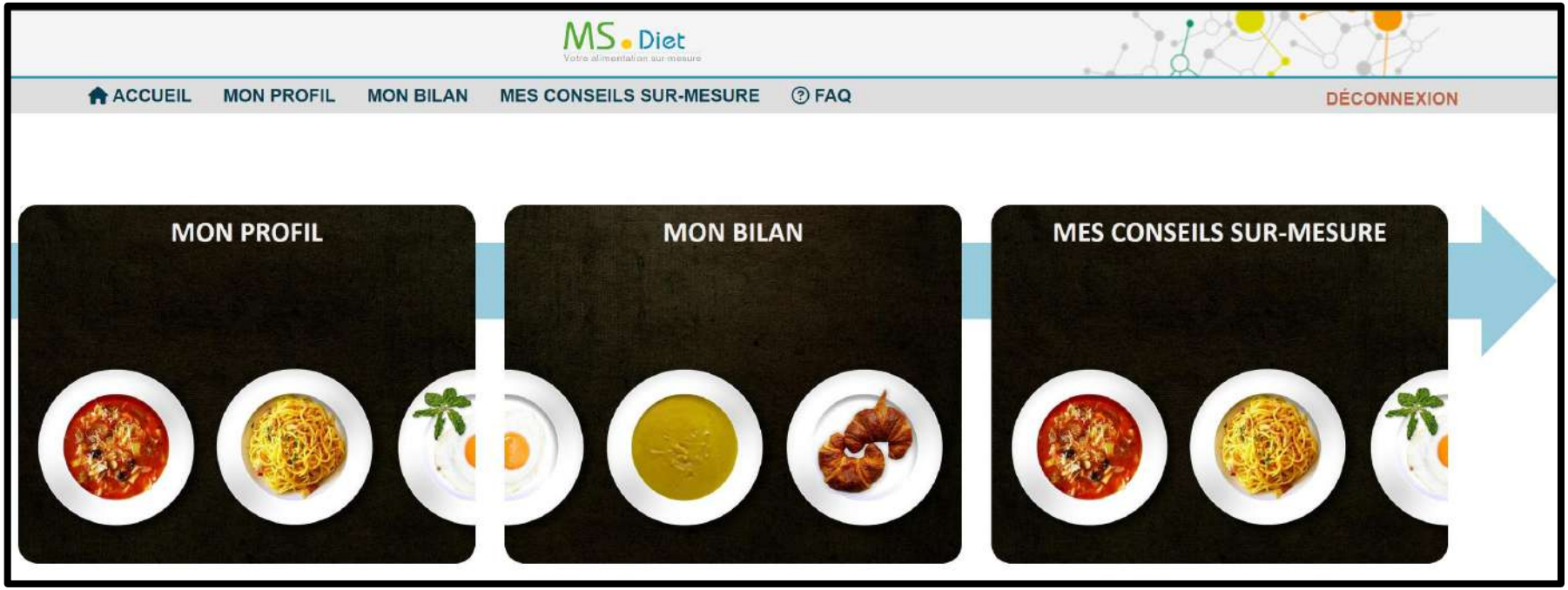
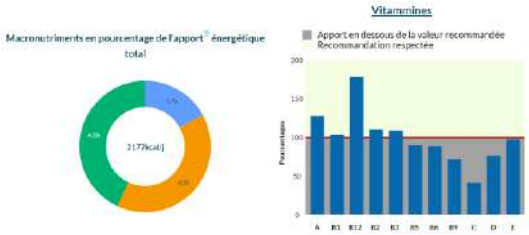



Online food questionnaire

Comparison to recommendations



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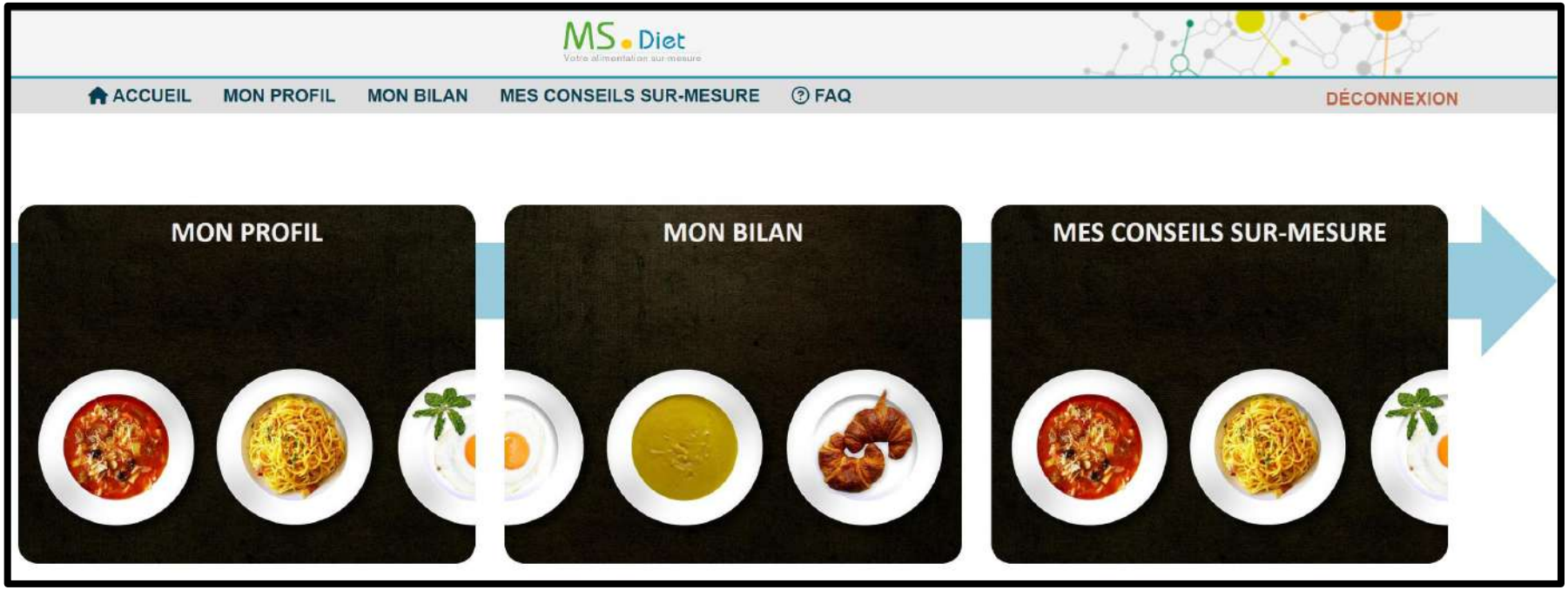


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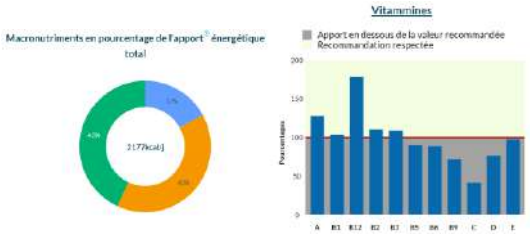
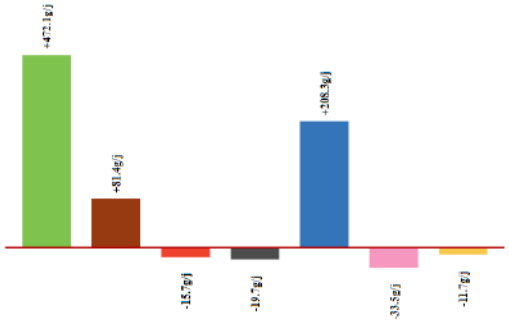



Tailored dietary changes



# Conclusion

**Adopting healthy and sustainable dietary choices is complex**

**Since 2010, Diet Optimization is increasingly used in Research**

**Diet Optimization can be implemented in a tailored dietary advices tool**

# Thank you for you attention

**Marseille**

1st French dairy cooperative

SODIAAL

Research & Innovation

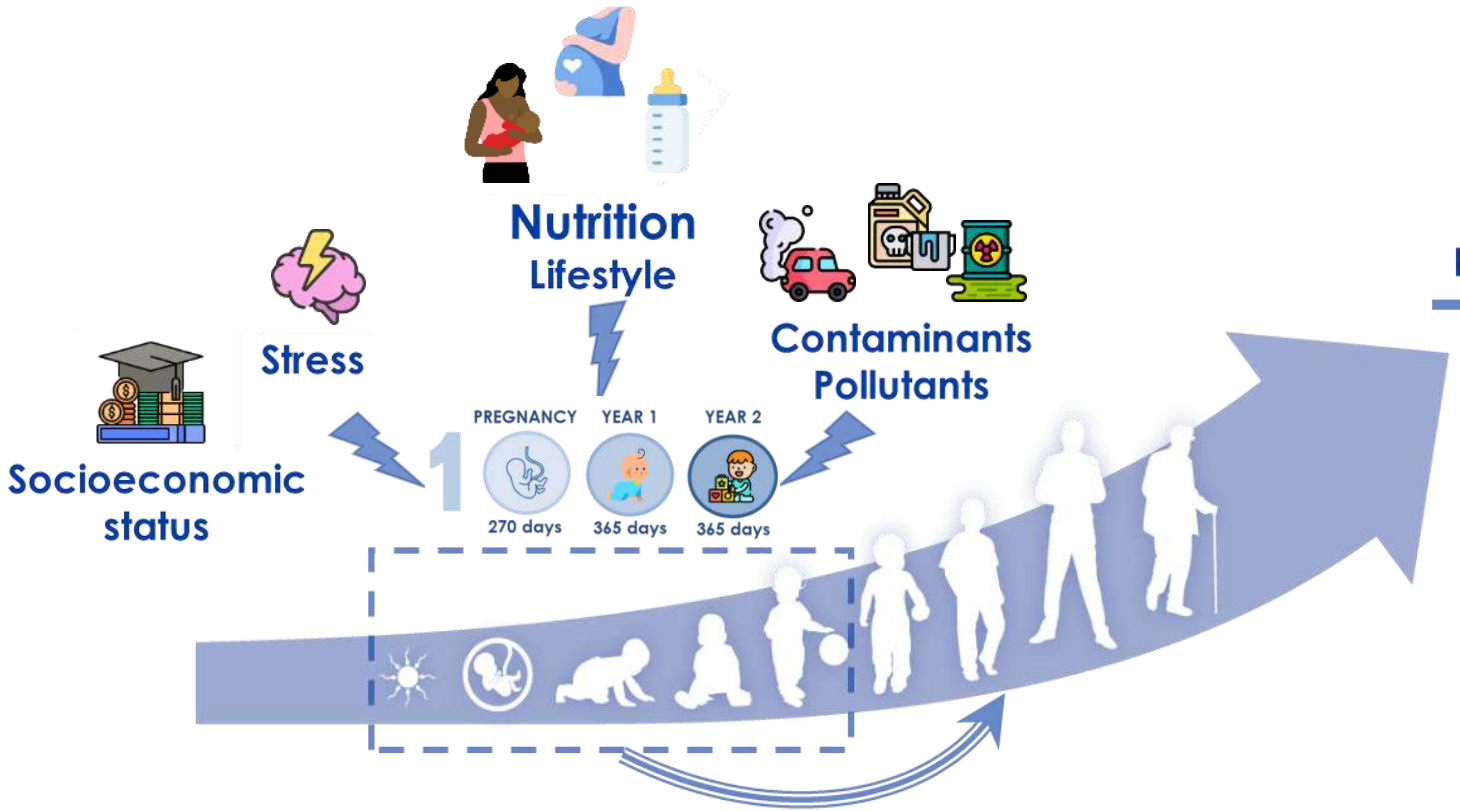
Science for Business

# How to use research to meet infant's needs ?

04/04/2024

# The first 1,000 days of life

**Unique window of opportunity** to offer a **healthy start in life** and ensure an **optimal health** on both the **short and long terms**



Overweight
Obesity
Type 2 diabetes
Cardiovascular diseases
Cancers
Allergies…

(Hales *et al.*, 1992; McMillen *et al.*, 2005; Barker, 2007) & Adapted from dohad for doctors

# Physiological characteristics

**Highest period of growth**

**+**

**Relative immaturity of biological functions**

Systems and organs have to mature

**+**

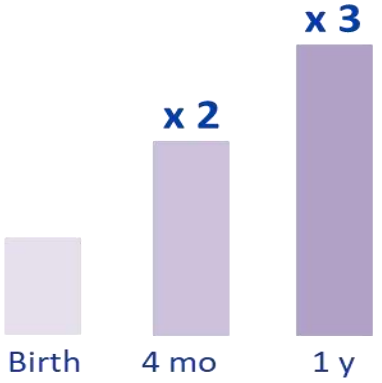
**Developmental plasticity**

Capacity to adapt to different environments at its greatest

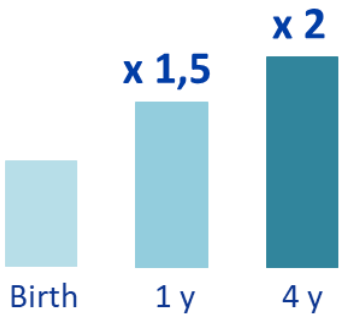
**Unique window of opportunity**

**Crucial role of nutrition (quantity and quality)**

**Weight**

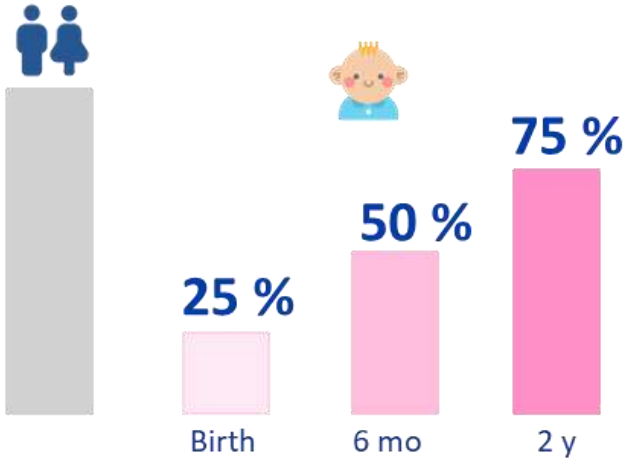


**Length**



**Brain**

***% of the size of an adult brain***



# Nutrition in the first 1,000 days

- **Infants and young children are not miniature adults**
- Their requirements are **many times higher** to meet metabolic demands
- They have **specific nutritional needs**

# Nutrition in the first 1,000 days

- Environmental factor that **can be controlled**
- **Foundation of lifelong health**
- **Proper nutrition** can ensure **healthy development**

**Objective: to provide optimal nutrition at each stage of development**

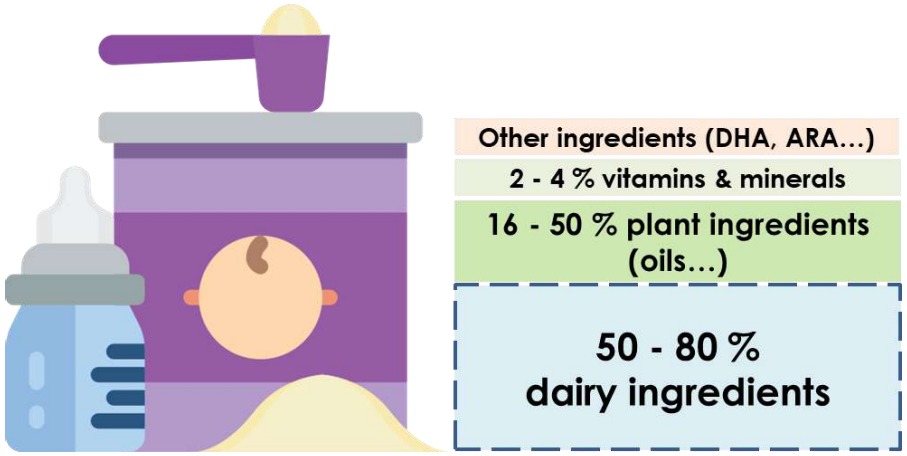
(WHO, 2003; ANSES, 2019)

# What's in an infant formula ?

**Breastfeeding = gold standard** but **38 % of < 6 months exclusively breastfed** (WHO/Unicef, 2022)

- Only substitute: **infant formulas**

→ **Need for continual improvement for infant formulas more biomimetic**




In compliance with **current regulations, several ingredients** are present in infant formulas **to closely mimic breastmilk composition**

Formulation with **dairy ingredients** that **have undergone various manufacturing processes** (heat treatments, pH shocks…)

**Modulation of infant formula structure** (denaturation, glycation…) and **digestion ?**

**Nutritional and physiological consequences ?**

# Focus on proteins

**How to improve the physiological efficiency of infant formulas by modifying the protein fraction?**

- **Quantity**
  - Deficiency can lead to suboptimal growth
  - High protein intake may cause adverse health effects in later life

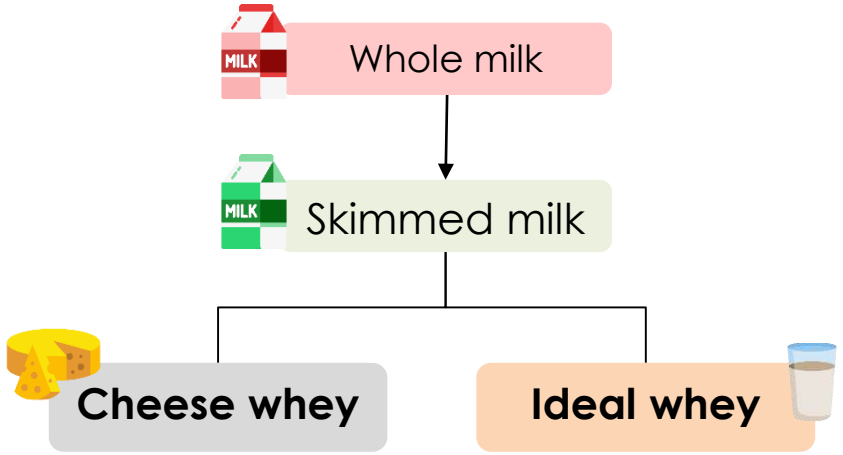
  Rapid weight gain in infancy

  → ↑ risk of later obesity

  (Hornell *et al.*, 2013; Koletzko *et al.*, 2014, 2019)

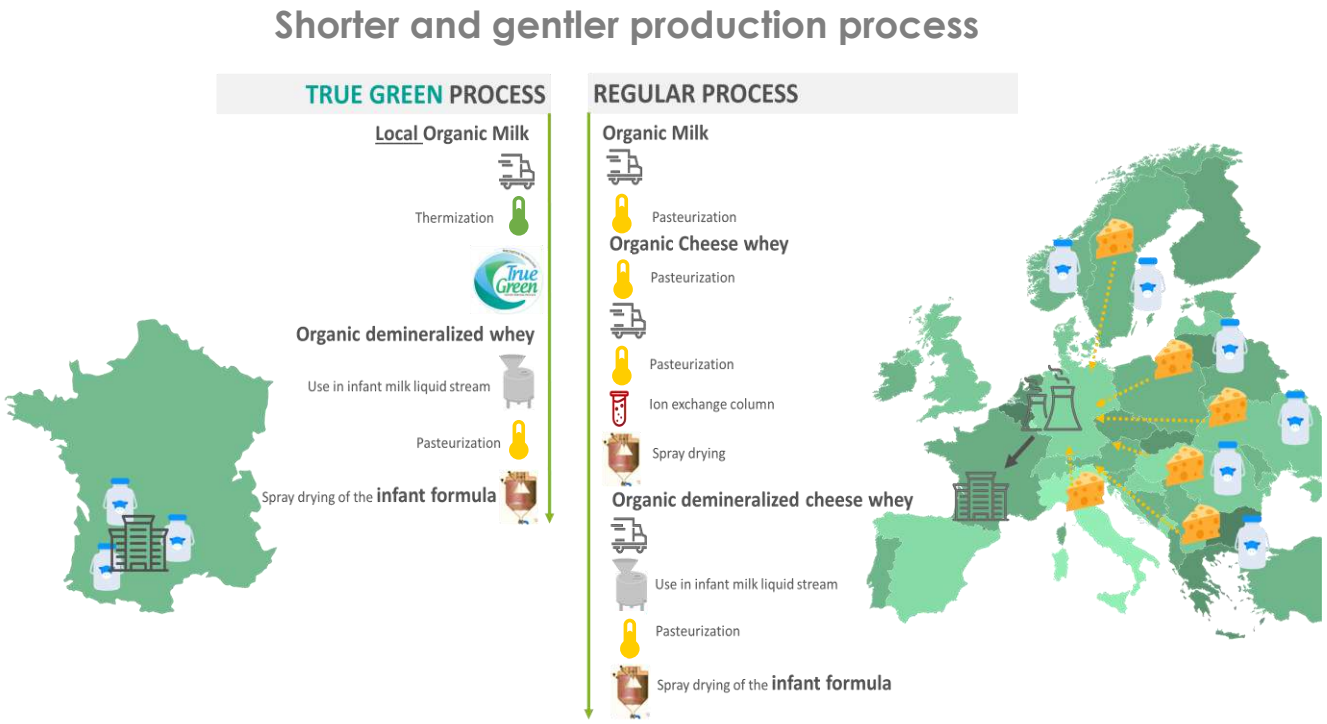
- **Quality**
  - Depends on the origin and processing routes of ingredients and infant formulas

  **Casein / whey protein: ~ 40/60%**



# process

- **Organic demineralized whey obtained directly from 100% local French organic milk**




→ **Improved nutritional profile:**

- preserved native structure of proteins
- ↑ bioactive protein (a-lactalbumin)
- improved amino acid profile

→ **Physiological benefits ?**

**Experimental strategy: from ingredient ... to physiological effects**

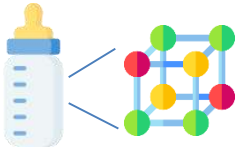
**and with complementary approaches**

# Thesis Cifre

1. Characterisation of commercial ingredients

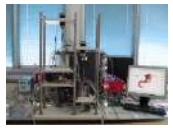
2. Manufacturing

3. Structure and composition



4. *In vitro* digestion kinetics

Dynamic *in vitro* digestion model



5. Plasma amino acid concentrations

6. *In vivo* intestinal physiology

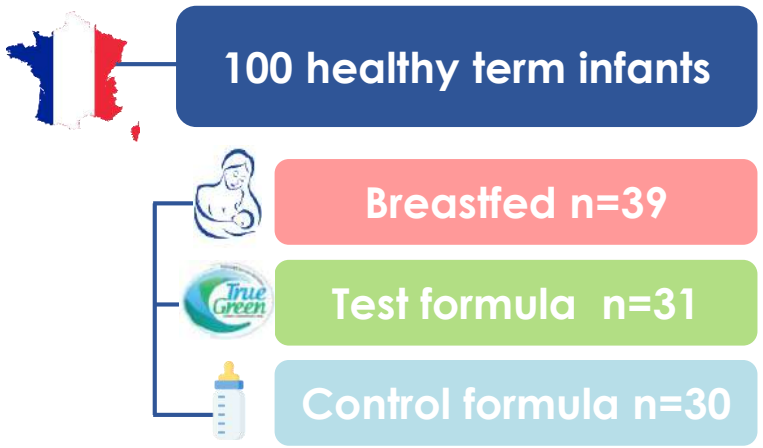
Yucatan minipiglet

**The use of native organic demineralized whey induced several similarities with human milk: protein profile, aminogram, digestion kinetics and had benefits on gut microbiota activity**

SODIAAL Coopérative Laitière Française INRAE la science pour la vie, l'humain, la terre numecan nutrition • métabolismes • cancer STLO

Lucile CHAUVET, 2023

# Clinical study




- **Test formula supports adequate growth and is well tolerated** in healthy term infants
- **An increase in total sleep** was also observed **at several months**
  **Infants fed Test formula tended to sleep + 36 h/month during the first 3 months**

**The improvement of infant formulas must begin at the formulation stage, with particular attention to the choice of dairy protein ingredients**

NUTRIBIO FEEDING LIFE NATURALLY

*NCT03936257, under revision*

SODIAAL

Research & Innovation

*Science for Business*

# Thank you

marion.lemaire@sodiaal.fr

NUTRISENS

ENTREPRISE À MISSION

Co-construction of personalised and specific nutritional solutions for vulnerable people.

Dijon, april 4th 2024

NUTRISENS

# Our mission :

Improving the lives of vulnerable people

**with the most suitable nutritional solutions.**

***For over a decade,***

*NUTRISENS is dedicated to meeting the specific nutritional needs of the most vulnerable people, with health and well-being at the heart of its mission.*

*Because we are convinced that bringing pleasure to nutrition contributes to improving the life of a patient as well as each individual, this development consolidates the company's objectives through :*

***a reason for being centered on the individual.***

ENTREPRISE À MISSION

NUTRISENS

# Our 3 pillars.

## IMPROVING PEOPLE'S HEALTH

Especially the most fragile.

## ACT TO REDUCE OUR IMPACT

On the environment, biodiversity and global warming.

## CO-BUILDING OUR SOCIETAL PROJECT

With our ecosystem and our collaborators.

ENTREPRISE À MISSION

NUTRISENS

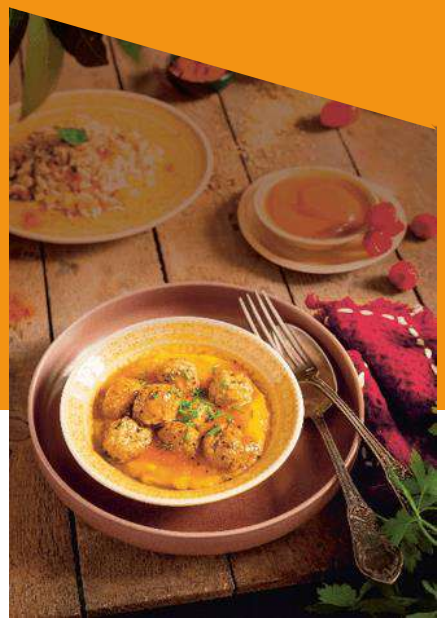
# We are the collaborative expert, European multi-specialist in pathologies.

## OUR AREAS OF THERAPEUTIC EXPERTISE

- DENUTRITION
- ALLERGY
- INFANT DENUTRITION
- GASTROINTESTINAL
- ALZHEIMER
- CICATRIZATION
- DYSPHAGIA
- BARIATRIC SURGERY
- DIABETES
- ONCOLOGY
- METABOLIC STRESS / CARCINOLOGIC DIGESTIVE SURGERY

# Customized and specific nutritional solutions.

## Modified texture food & drinks



## Specific diets

## Oral Nutritional Supplements

## Specific Oral and Enteral Nutritional Supplements

# What do **you see?**

# What **it really is...**
# a bit more than what you see !

**Adapted food** + **Adapted packaging**

Inspired by the french traditional cooking dish…

**Shape** developped with an occupational therapist :
easy handling, adapted to tired people, arthrosis or with handling disorders
Higher shape than existing packagings to limit burning risks when handled

Ergonomic handles

Modified **texture**, developped with a speech language pathologist, following IDDSI recommendations

and above all… It is a recipe designed by our Chefs & engineers with
The right portion size
The right nutritional values
& a great taste !

Orange **colour**
Because it's easier to see orange when suffering from sight troubles (cataract, glaucoma, AMD* …)

* Age-related Macular Degeneration

# What do **you see?**

# What **it really is...**

# **Oral nutritional Supplements** looking like « real food »

# What do **you see?**

# What **it really is...**

products adapted to autonomy sustainability

# We build together and innovate.

## 1 R&D CENTER

**+ 1 application kitchen**

**and people at each site**

## PATIENTS

**Tests and small productions evaluation**

## PUBLIC AND PRIVATE PARTNERSHIPS

**Research centers, institutions, associations, member of Alliance 7, Alim50+,etc.**

## THANKS TO OUR ECOSYSTEM

## A CROSS FUNCTIONAL TEAM

**Engineers, chefs, dieteticians**

## A NUTRITION COMMUNITY

**Health professionals who support us**

## A SCIENTIFIC COMMITTEE

**The best scientific experts to support us**

# Consumer-centric innovation.

**We are serving vulnerable people,**

**we can't do that without putting ourselves in their shoes**

NUTRISENS

# THANK YOU !

**Laure LESAGE**
Dysphagia Product Manager France

llesage@nutrisens.fr

40 route de Brignais
69630 Chaponost
www.nutrisens.fr

NUTRISENS
Ensemble, redonnons goût à la nutrition.

# Using rice flour for dysphagia diet

Kanae Ashida, Principal scientist, Institute of Food Research

https://youtu.be/0Pfnfj1xqgs

# Using collagen to meet the needs of active people?

Vitagora
Plus vite, plus loin. Ensemble.

Vita CONNECT Dijon • April 4, 2024

# Why collagen?

# Collagen, the most abundant protein in the body

## WHAT IS COLLAGEN?

- **The most important building block** of all connective tissues and helps to hold the body together
- **The most abundant protein** in our bodies
- **It provides strength, cohesion and elasticity** to skin, cartilage, ligaments, bones...
- It **connects** the different tissues and cells.

## COLLAGEN DISTRIBUTION IN HUMAN BODY

(BY WEIGHT RATIO OF DRY MASS)

THE BODY'S ABILITY TO REPLENISH COLLAGEN DECREASES WITH AGE

- **Skin** ageing
- **Joint** discomfort
- **Brittle** bones

Peptan

**Bioactive collagen** peptides for a healthy lifestyle

Rousselot
A Darling Ingredients Brand

# Why exactly collagen **drink**?

Customer unmet needs:

« Can we use collagen as a part of our *daily* routine ? Like, food or beverage ?
Can collagen become accessible for everyone and everywhere ? »

# Core principals:

qwell

## High quality / backed by science

well proven supplier Rousselot - Peptan, DSM,
carrefuly selected production partner

## Effectiveness

minimum **5** g of collagen,
“smart” mixture of other ingredients

## Safety / Sustainability

no sugar, no préservants,
recycled bottles

# Peptan: A world of health benefits

Peptan

Bioavailable & bioactive
Backed by science

Holistic benefits with proven efficacy in mobility, sport and beauty

Co-branding program

Globally leading brand*

Available in a wide range

Bovine, Fish, Porcine

Easy to use
Neutral taste and odor

Application versatility

*NutraIngredients State of the Industry Survey 2020*

Rousselot
A Darling Ingredients Brand

# Where are we now?

Made in France and made by French scientists and producers!

Vitagora membership FoodTech Dijon Bourgogne – Franche-Comté

Production with a French partner

Co-development of new collagen containing products

Global expansion

# Where to find us?

## Distribution

- Commercial contract with Enseignes Casino
- Online sales: Ankorstore, Amazon, Fitadium, uFoodin, Eaux du Monde
- Restaurants and caterers, delicatessen
- Sports clubs, beauty salons

## Communication & Events

- Sponsor of sporting and cultural events
- Presence on social networks
- Points of sale: promotional actions

qwell

# Thank you!

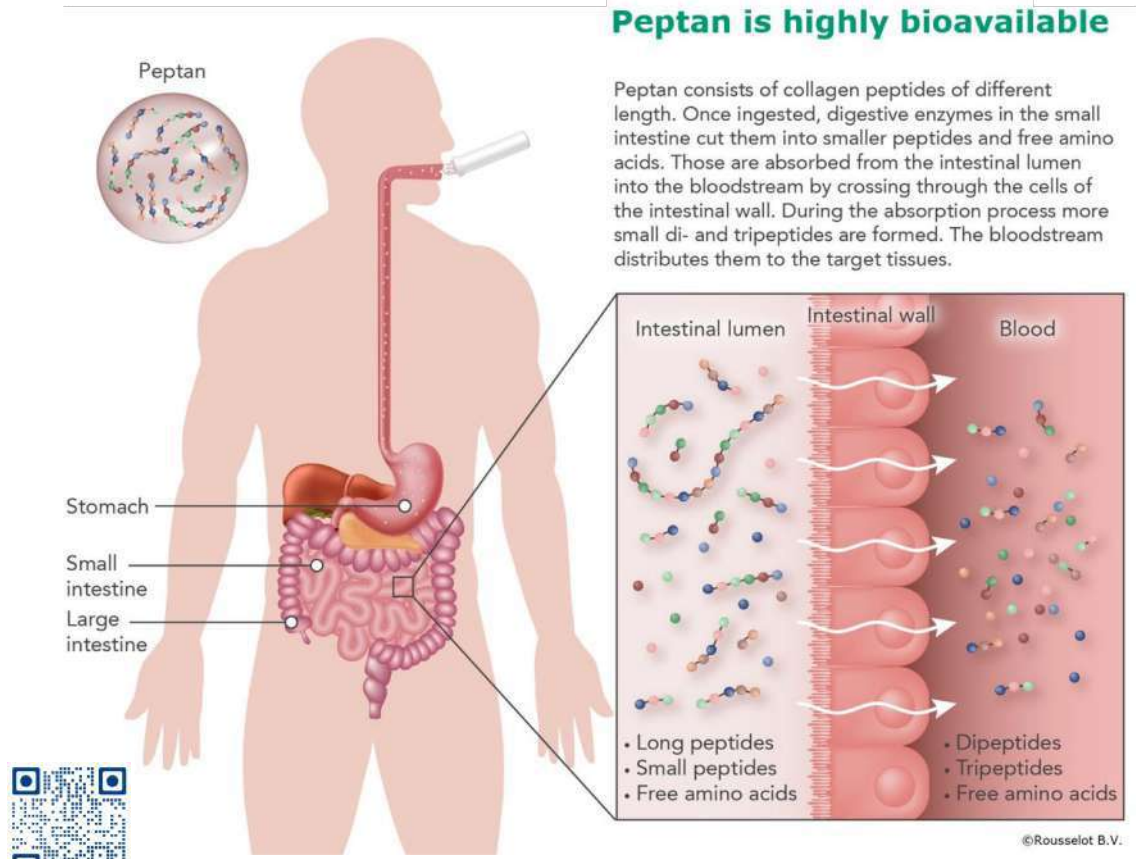
www.qwellcollagen.com - *coming soon* • https://feel-qwell.com/

Welldrinks France

Qwell France

Qwell France

# How does it work?




Source: Kleinnijenhuis et al 2020

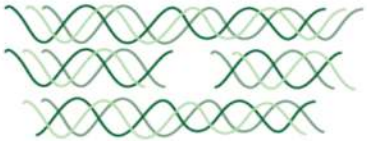
Collagen has a unique amino acid composition, containing high amounts of hydroxyproline.

Hydroxyproline forms hydrolysis-resistant bonds with other amino acids.

Bioactive peptides work as messengers, exerting a wide range of biological effects (bioactivity) in different tissues, e.g. bone, joint, skin, fascia of muscle…

Rousselot
A Darling Ingredients Brand

# What is collagen?

| Grade | Form | Solubility | Application examples |
|---|---|---|---|
| Native collagen |  | Insoluble | Medical materials, collagen casings |
| Gelatin | | Medium | Gelatin desserts, confectionery |
| Collagen Peptides | | High | Dietary supplements, functional foods |

Enzymatic Hydrolysis

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# Peptan & Sports Nutrition

In various studies, **Peptan** collagen peptides have been observed to promote Sports Nutrition benefits:

Reduction of muscle soreness after exercise

Acceleration of recovery after exercise

Increased performance due to decreased soreness

Reduction of number of awakenings and improved cognitive performance

Does not alter exercise-induced gut issues; hence aiding in gut comfort

Partial substitution of whey would yield the same results on recovery & performance, while reaping both proteins' benefits


*Clifford T, 2019. doi: 10.1007/s00726-019-02706-5.*
*Jiang JX, Yu S, Huang QR, Zhang XL, Zhang CQ, Zhou JL, Prawitt J (2014) Agro Food Industry Hi Tech 25.*
*Taylor G, 2022. doi: 10.1007/s00394-022-03051-2.*
*Thomas, C. 2023. doi: 10.1007/s00394-023-03267-w.*
*. Robberechts, R. 2023. doi: 10.1123/ijsnem.2023-0070.*
*. Newman, C. 2023. doi: 10.2196/42967.*

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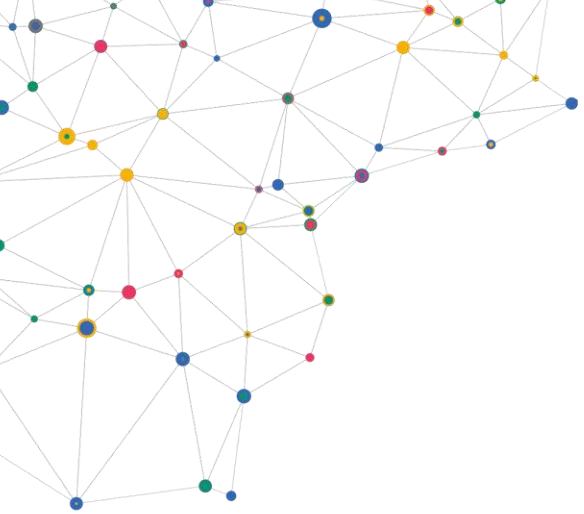
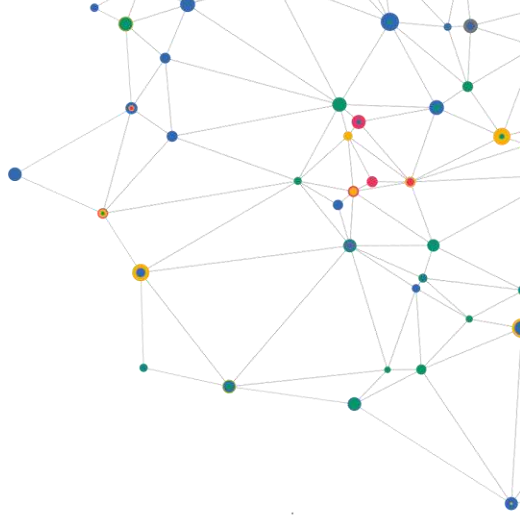
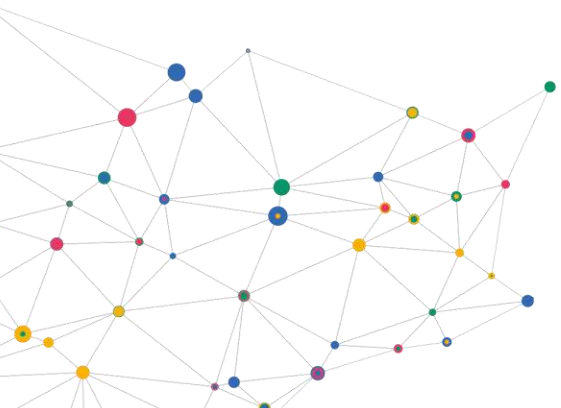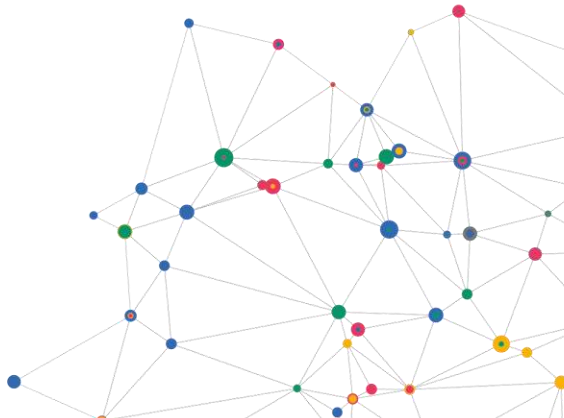
# Thank you!