

Sensory Perception and Eating Behaviour: Why Dairy Matters

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Pick your healthy dish!

menu

Garden Vitality Bowl

A fresh mix of crisp greens and colourful vegetables, packed with vitamins and nutrients to support a healthy lifestyle.

8EUR

Sweet Creamy Delight

A smooth and creamy bowl of ice cream, offering a rich and sweet dessert experience

8EUR

Pick your healthy dish!



Sweet Creamy Delight



Garden Vitality Bowl



Outline of the presentation

- *How sensory perception shapes food choices and eating behaviour*
- *The unique sensory properties of dairy*
- *Dairy's role in supporting improved appreciation in sustainable diets*

Do the sensory properties of food influence food intake?

“ Food has no nutritional value until it is chosen, accepted, and consumed ”

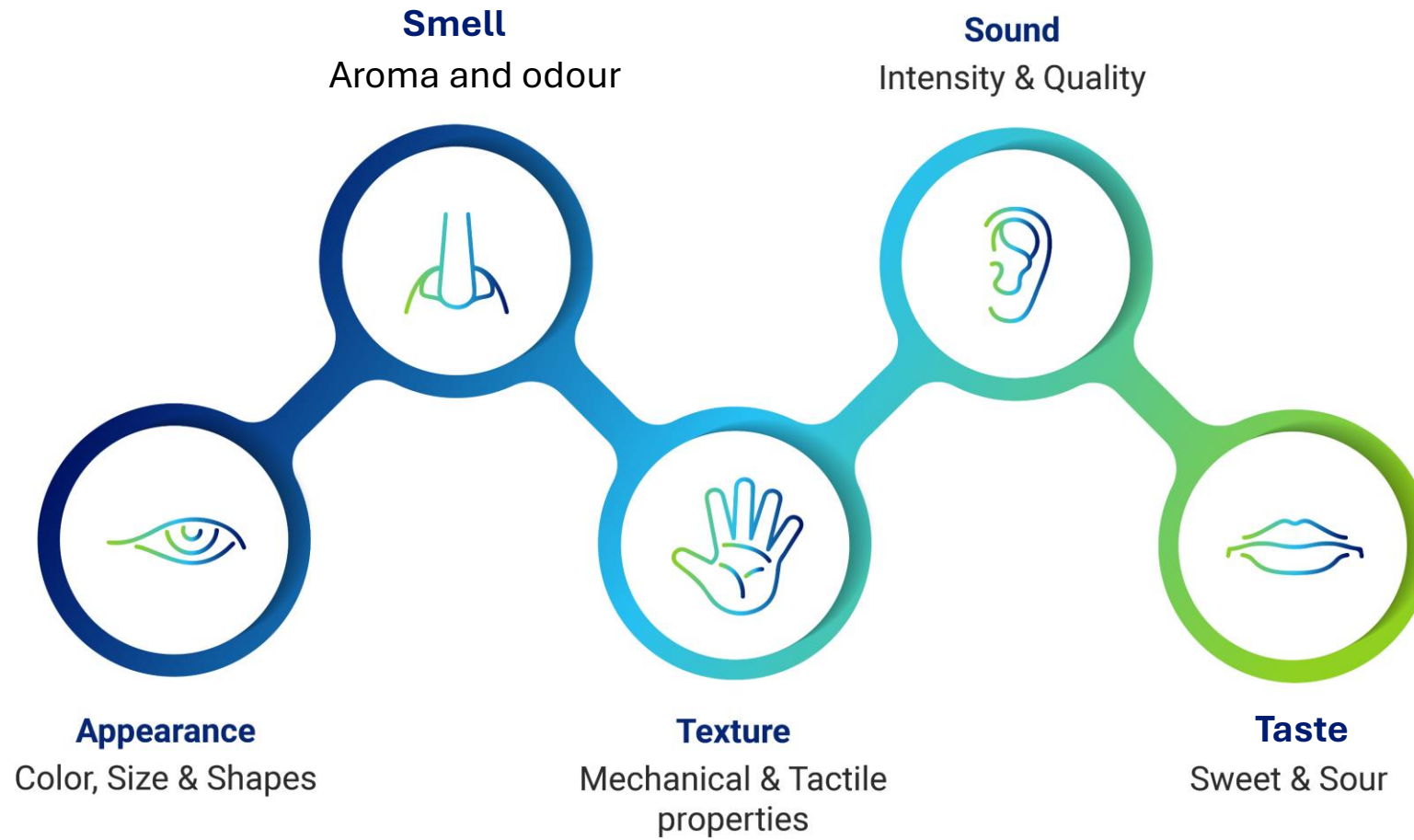
(Forde & Delahunty 2004)

- Increasing interaction between **sensory science** and **nutrition**

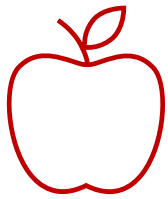
“There is no health without pleasure” (de Graaf 2023)

- **Palatability** (positive hedonic evaluation of food) influences **appetite** and **food intake** in humans *(Sorensen et al. 2003)*

Food sensory properties



How do we perceive things?



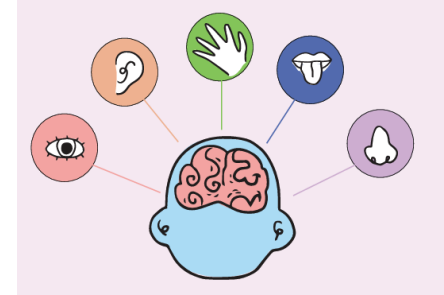
Stimuli

Sensory **properties** of food
(e.g. colour, sound, tastants,
odour molecules,
texture/form)



Sensation

Detection of sensory **stimuli** using
our **senses** (sight, hearing, taste,
smell, touch) via different sensory
receptors and **converting** them into
sensory signals



Perception

Interpretation of the **sensory signals** to create **meaningful experience**

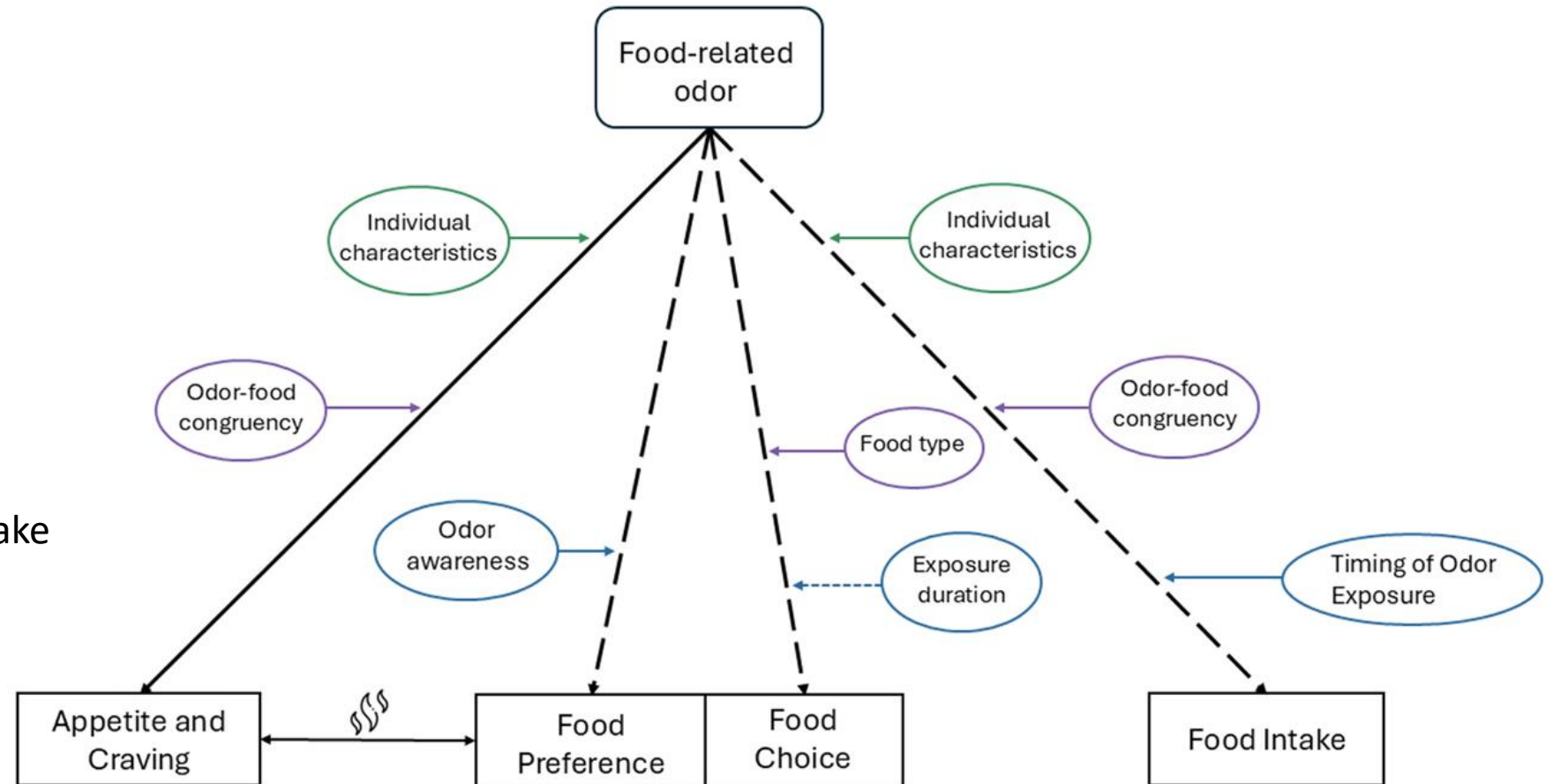
Flavour: Taste, Odour and Somatosensory

Food perception is a result of all senses

Effects of food-related odours on eating behaviour

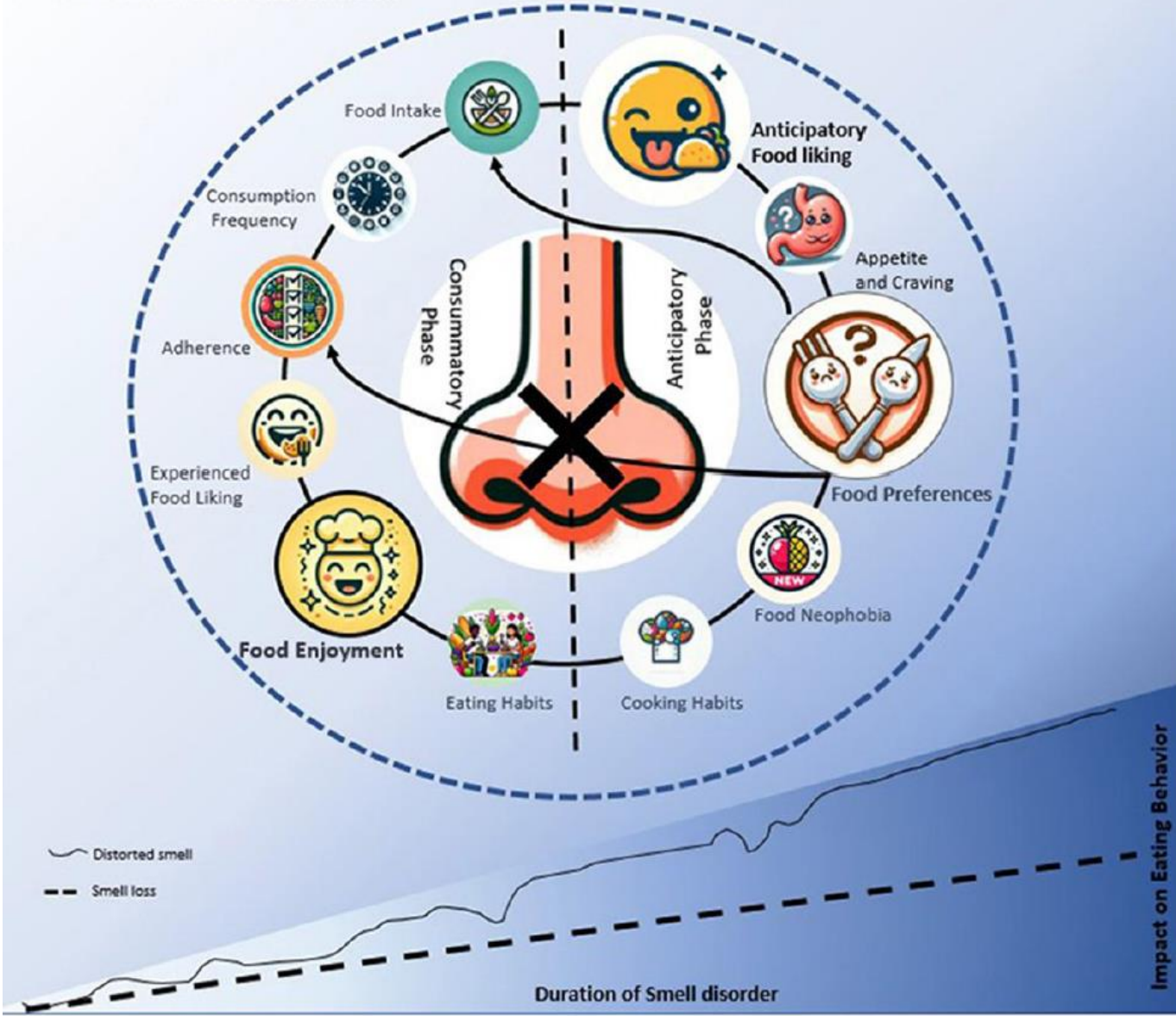
Odours as food cue:

- Stimulate appetite and direct attention towards cued foods: *Sensory specific-appetite*
- Impact on food choice and intake is inconsistent



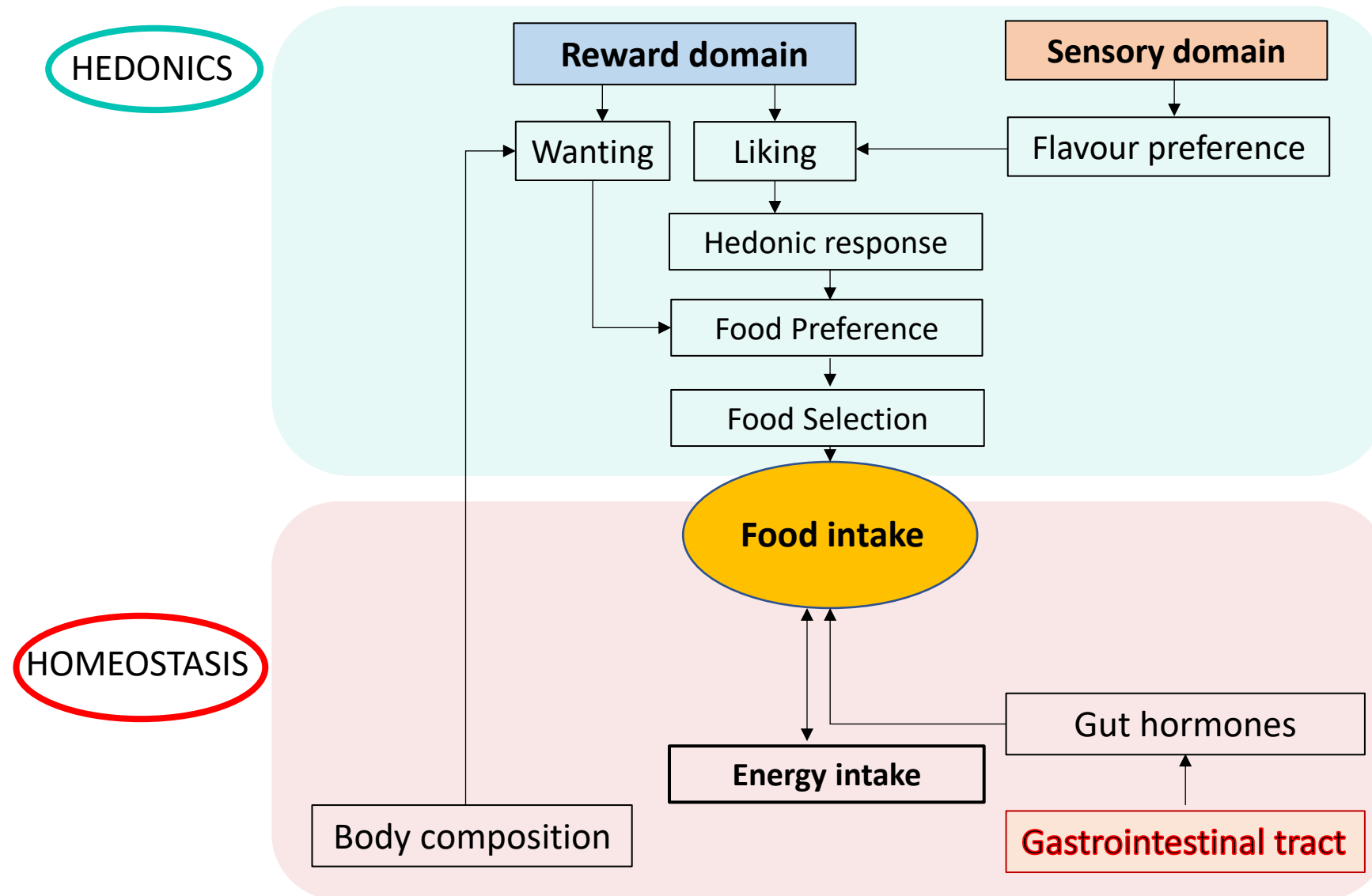
The impact of olfactory dysfunction on eating behaviour

Assessing the Impact of Olfactory Dysfunction on Eating Behavior: A Systematic Scoping Review and Call for Standardized Assessments



- Olfactory dysfunction primarily affects the pleasure of eating.
- **Food liking, preferences and enjoyment** are most affected
- **Distorted smell** affects eating more than smell loss
- **The impact changes with time** as people adapt
- **Future priorities:** better assessment tools and interventions to improve the eating experience

Homeostatic and hedonic food intake regulation



Food perception to ingestion

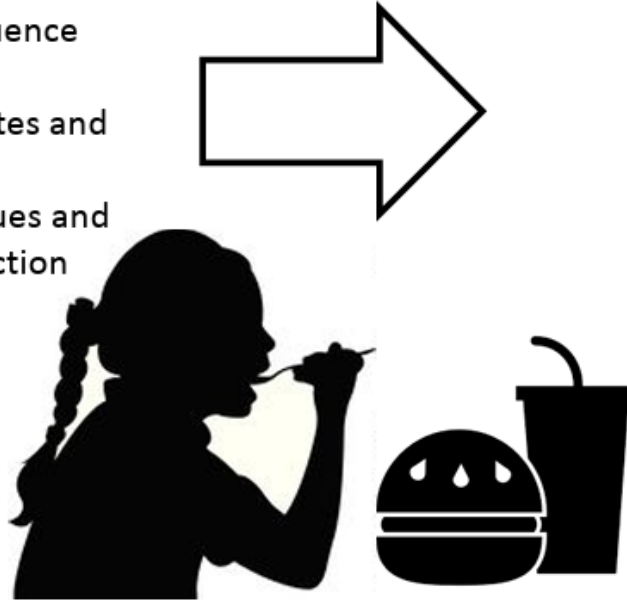
Pre-meal

- A food's odour and visual properties influence food preferences and portion selection
- Odours stimulate sensory specific appetites and direct choice towards certain foods
- Learned associations between sensory cues and experienced fullness inform portion selection



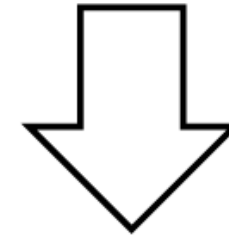
Meal to meal

- Acute disparities in energy intake are partially adjusted for at the next meal
- Repeated consumption of the same food establishes important learned associations between specific sensory cues and the anticipated feeling of fullness derived



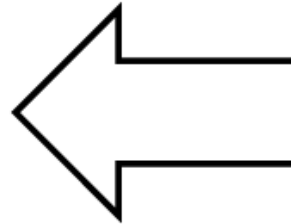
Within meal

- Food texture informs bite size and eating rate (g/min)
- Taste provides feedback on the nutrient density of the food being consumed
- Palatability can stimulate additional food intake
- Visual cues provide feedback on amount consumed and influence plate cleaning

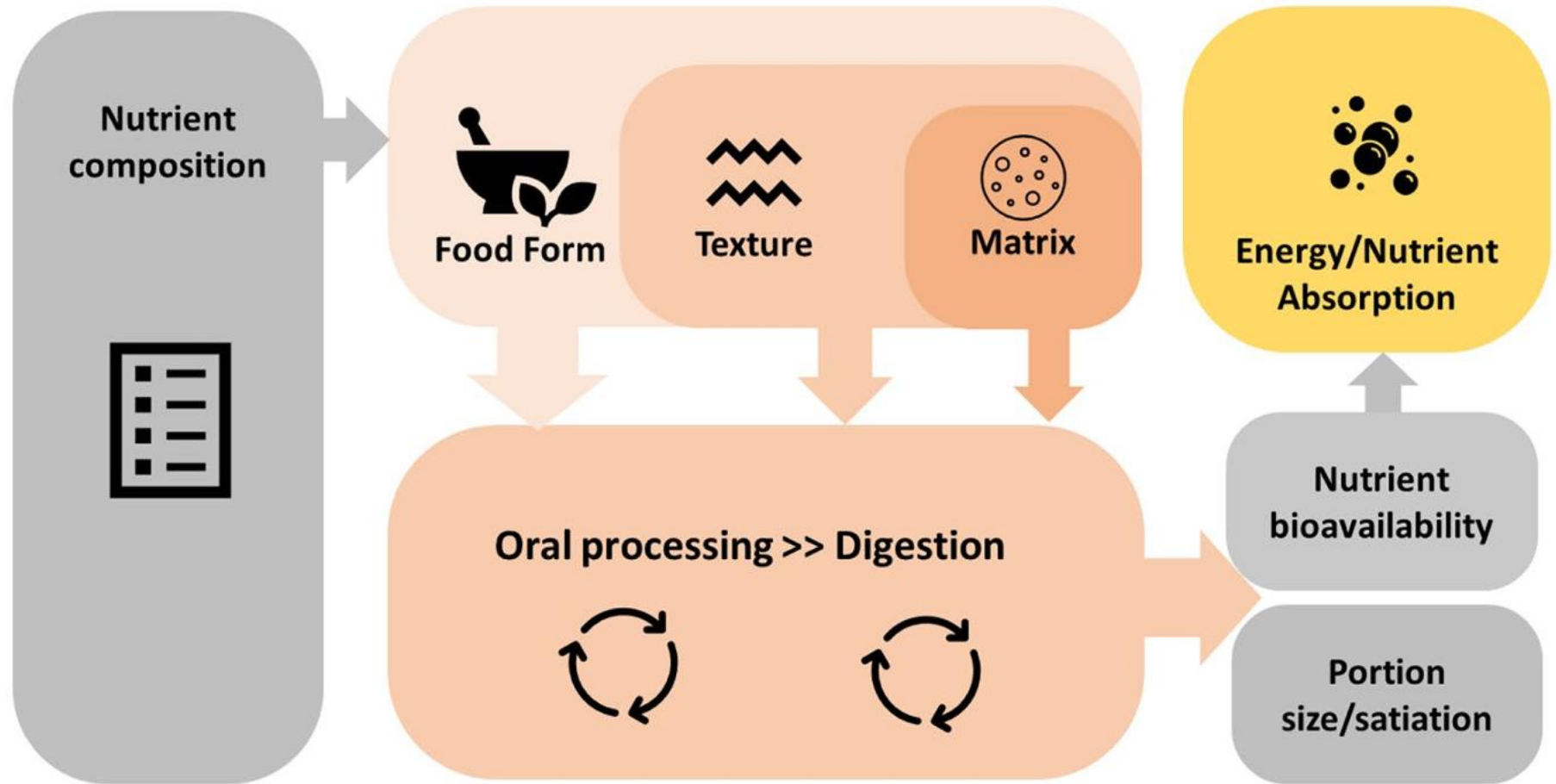


Post-meal

- Satiety can be influenced by food form, energy content and macronutrient composition
- Post-meal satisfaction is also associated with the sensory experiences during the meal and the memory of meal experience and amount consumed

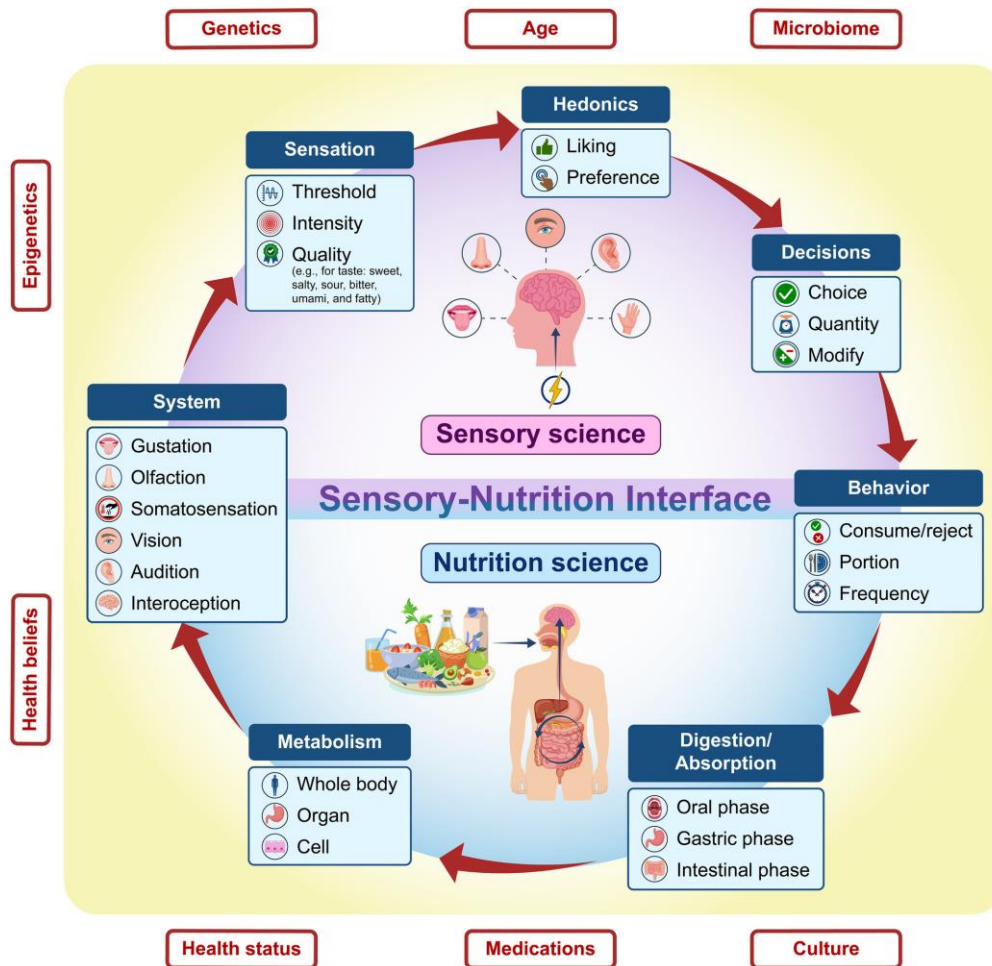


Factors influencing energy and nutrient bioavailability



Schematic illustration of the different levels of food structure (food form, texture, and matrix) and the association with energy and nutrient bioavailability

Opportunities for sensory science to improve dietary behaviour



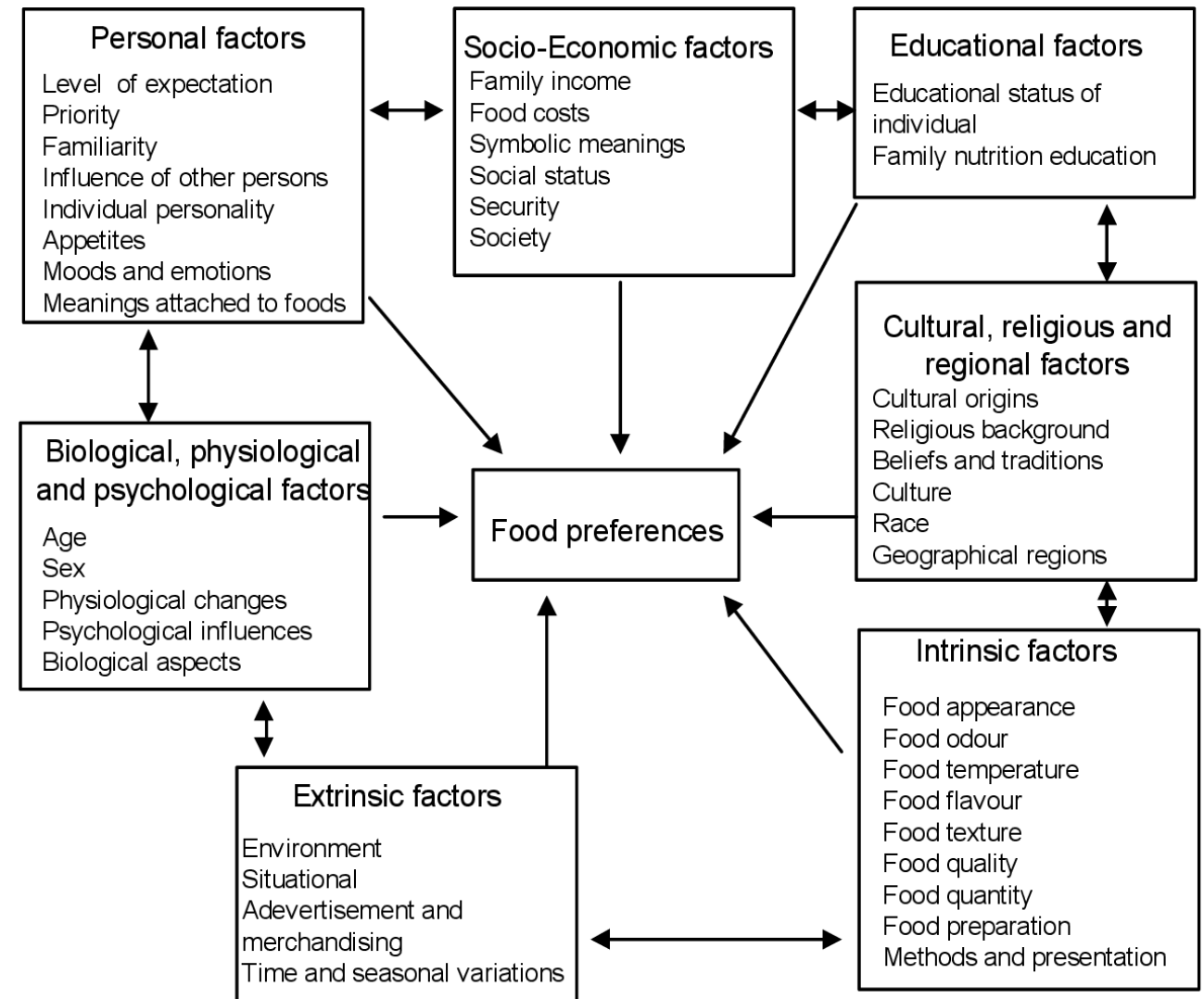
- **Undernutrition:** modifying food palatability.
↑palatability ↑intake (patients, elderly)
- **Overnutrition:** manipulation of food texture to influence satiation and satiety
- “**Sensory-nutrition** considers the interaction of ‘food and eater’ and keeps eating pleasure at the heart of approaches to improve health” (*de Graaf 2023*)

Factors influencing food preferences

PHYSIOLOGICAL INFLUENCES

PSYCHOLOGICAL INFLUENCES

ENVIRONMENTAL INFLUENCES



Sustainable taste as a conceptual integration of sensory, sociocultural, and structural dimensions

Integrating Sustainable Taste into Behavior-Change Framework:

COM-B + SER



FIGURE 1

Integration of sustainable taste into the COM-B model using the SER (Sensation-Emotion-Relation) framework.

‘Dairy matrix’ and dairy sensory properties

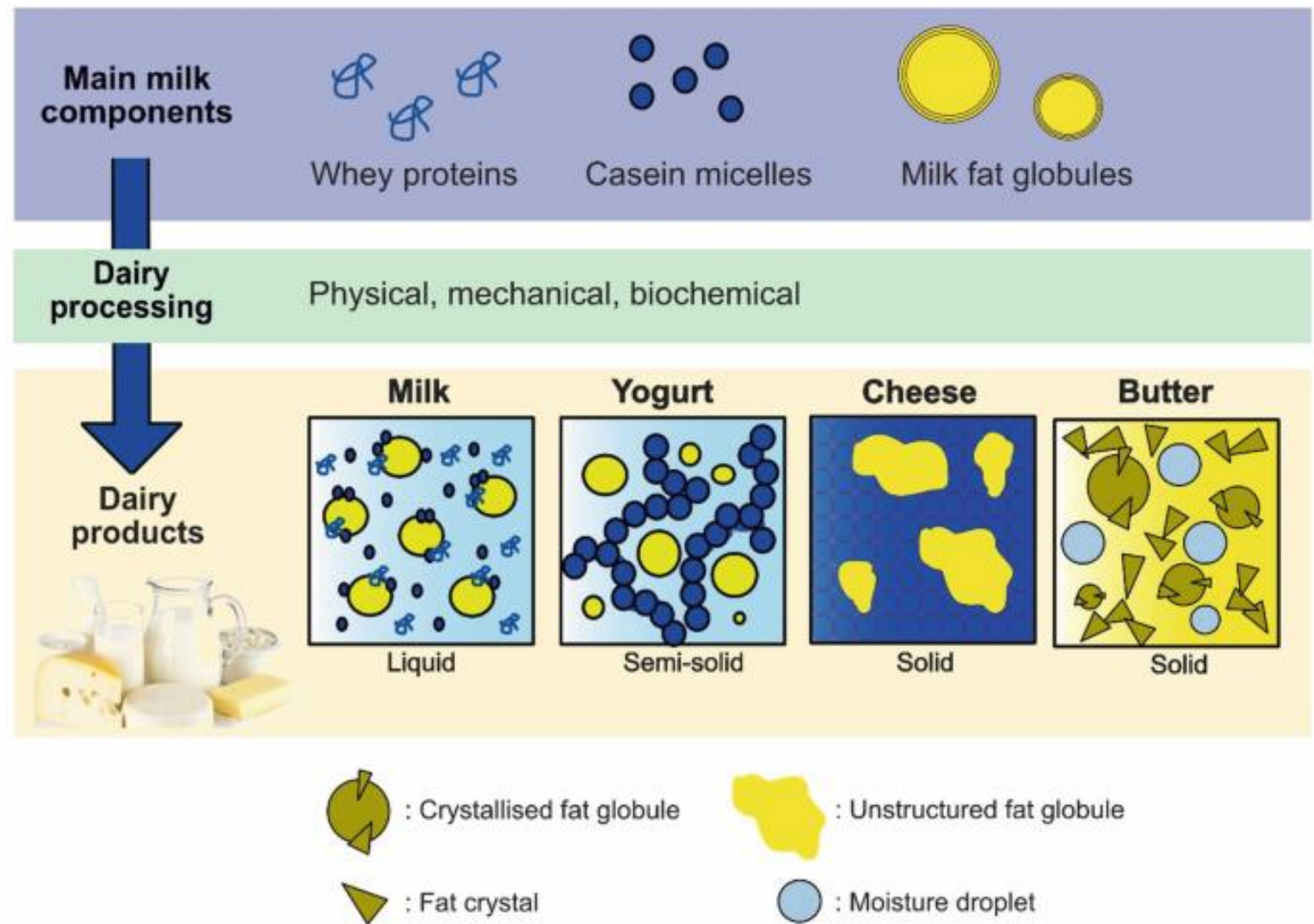
Definition of the dairy matrix

‘The **food matrix** is not only the composition of nutrients, bioactive constituents, and other compounds present, but also how they are packaged and compartmentalised.’

Weaver & Givens 2025 Cr Rev Food Sc & Nutr

Dairy matrix: ‘describing the unique structure of a dairy food, its components (e.g., nutrients and non-nutrients), and how they interact.’

Mulet-Cabero et al. 2025 Nutrients



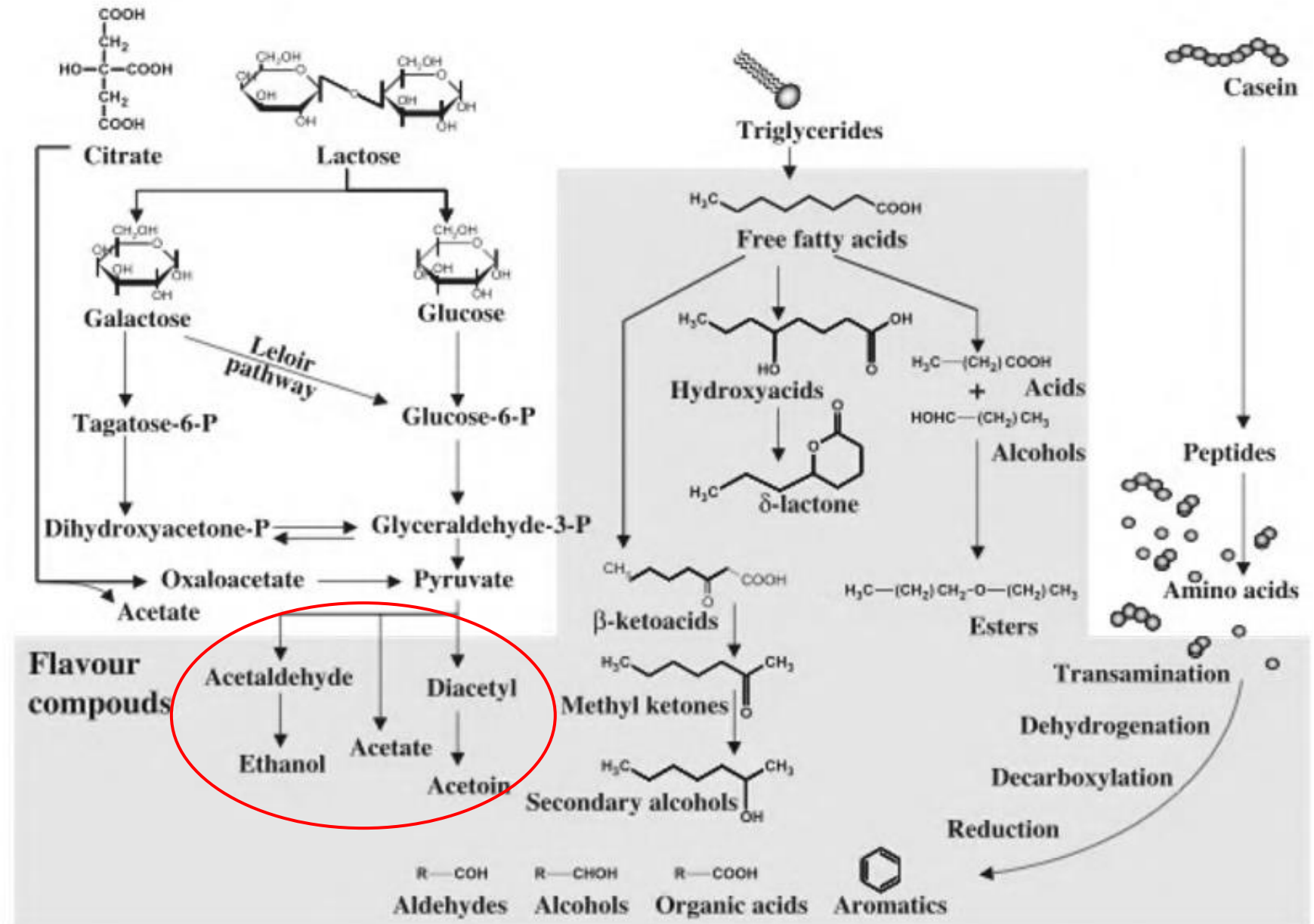
Mulet-Cabero 2021, Bio Dig Lip from foods

Unger et al. 2023 Curr Dev in Nutr

Flavour compounds in dairy products

Carbohydrates

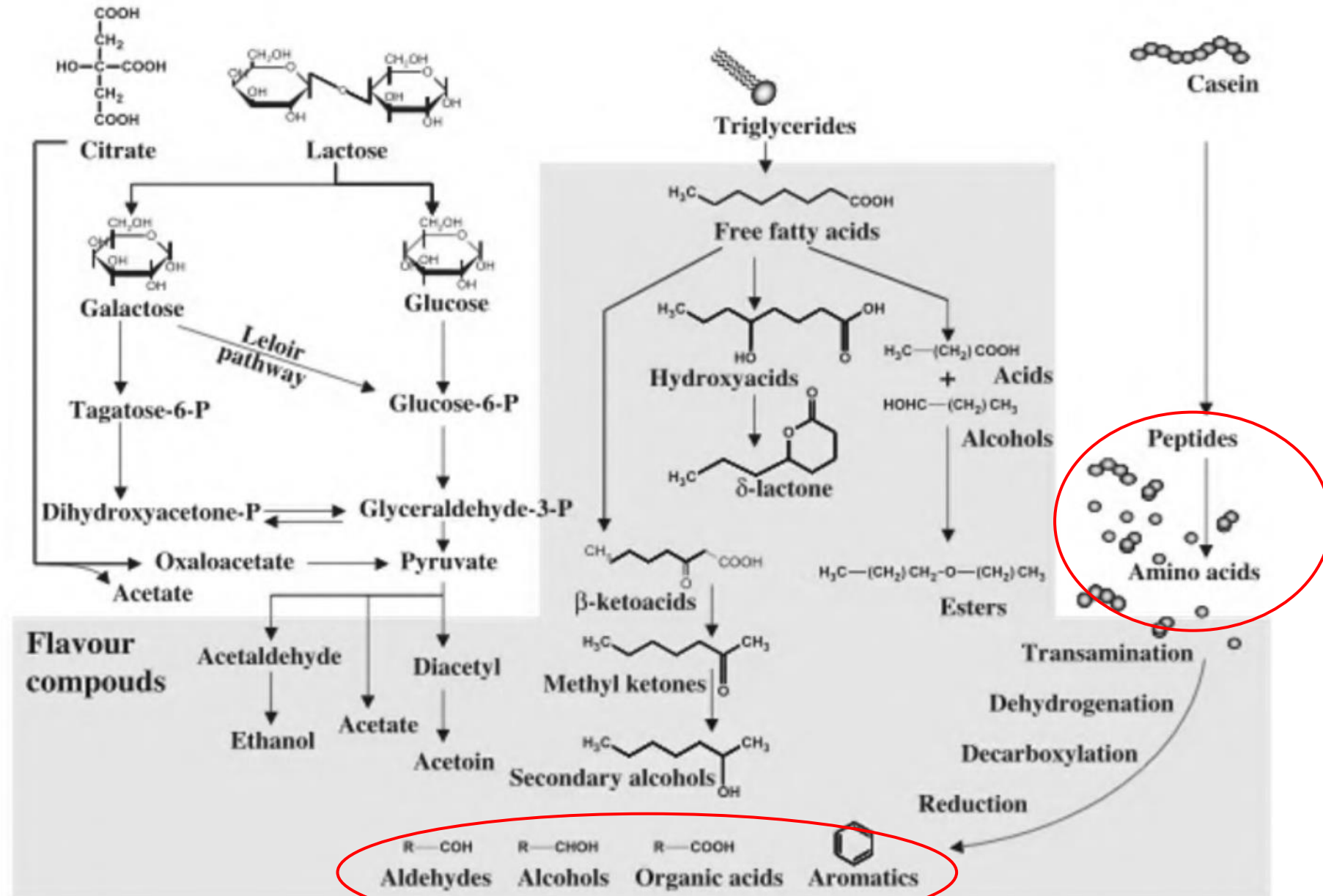
- **Diacetyl:** Buttery flavour
- **Acetaldehyde & Acetoin:** Yoghurt flavour, freshness
- **Acetate:** stone fruity - too much, it turns pungent (nail polish)



Flavour compounds in dairy products

Proteins

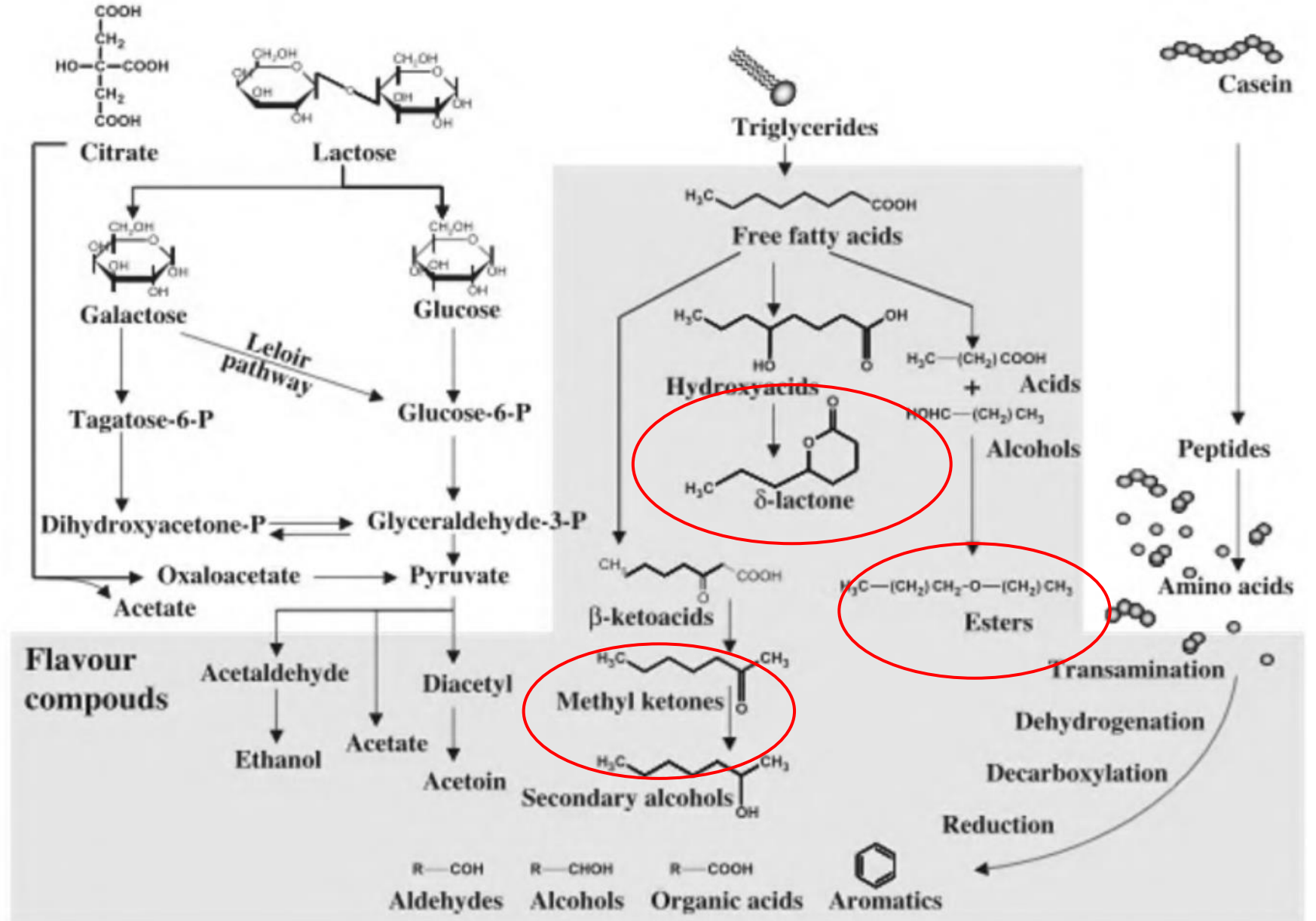
- **Peptides and free amino acids:** Glutamate, umami and γ -glutamyl; Kokumi
- **Acids:** Propionic acid is associated with nuts (e.g., Emmentaler)
- **Aromatics:** Phenols associated with dried species



Falvour compounds in dairy products

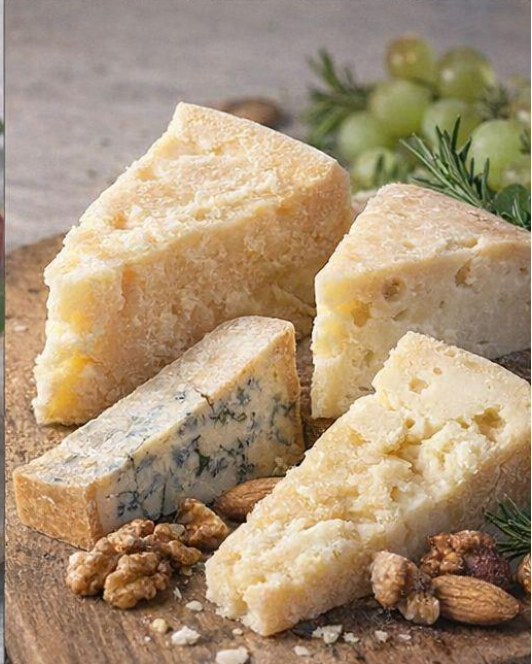
Lipids

- **Short- and medium-chain Free fatty acids:** Pungent, rancid, and cheesy, goaty, soapy aromas
- **Methyl ketones:** Fruity and blue cheese notes
- **Esters:** Fruity & Floral Aromas
- **Lactones:** Creamy, Nuts & Coconut flavour



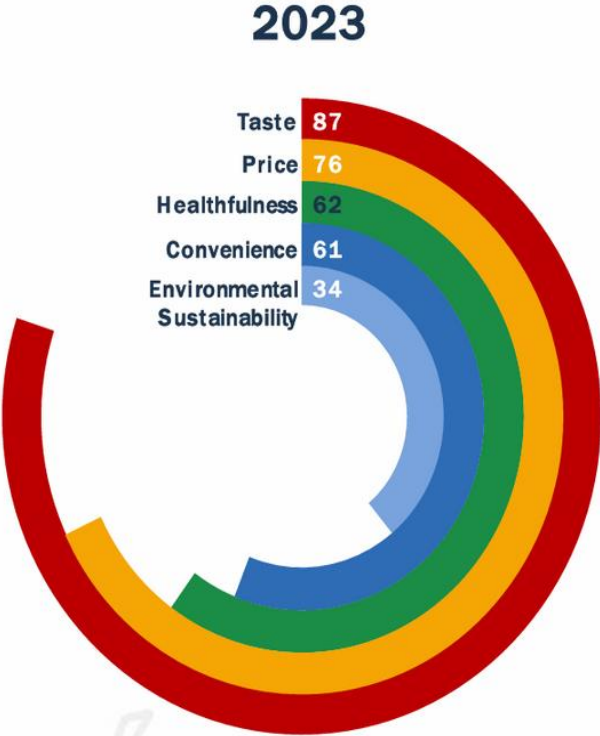
Flavour Wheel and Sensory profile of dairy



Fresh Cheese	Aged Cheese
	
Fresh Cheese	Aged Cheese
- Mild, creamy, and moist texture - Delicate and milky flavor	- Firm, crumbly, and dense texture - Rich, sharp, and nutty flavor

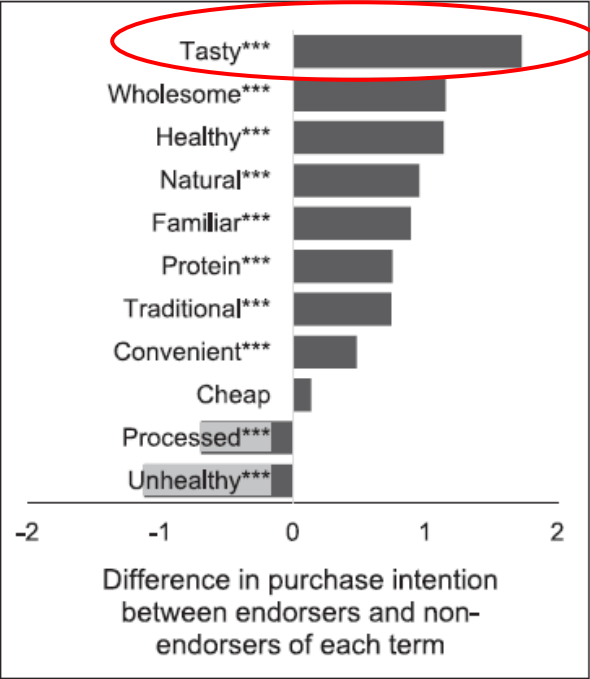
Source: LinkedIn Prateek Mittal

Consumers' perceptions of plant-based alternatives relative to their animal-derived foods

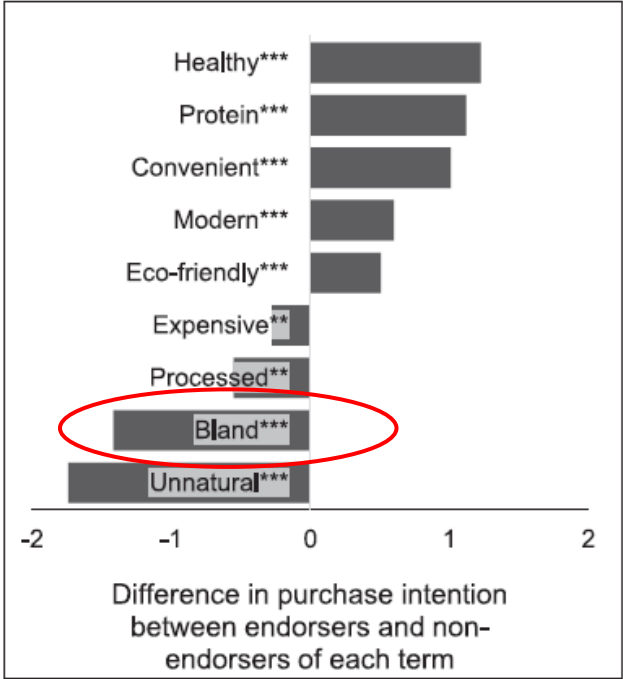


2023 Food and Health Survey
International Food Information Council

Animal-derived



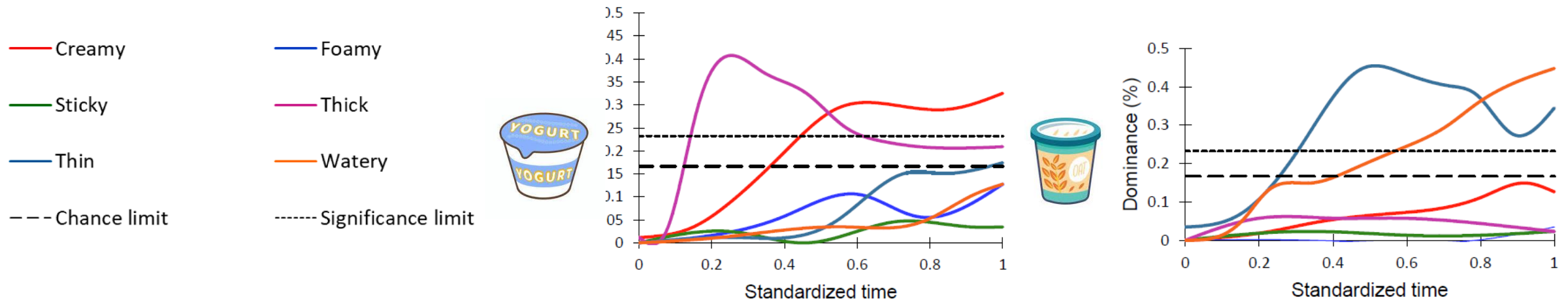
Plant-based



Penalty lift analysis: **unnatural** and **bland** were the greatest opposing drivers of purchase intention for PBA

Kershaw et al. (2025) Food Qual & Pref

Overall liking and dynamic texture perception in plant-based yoghurt alternatives



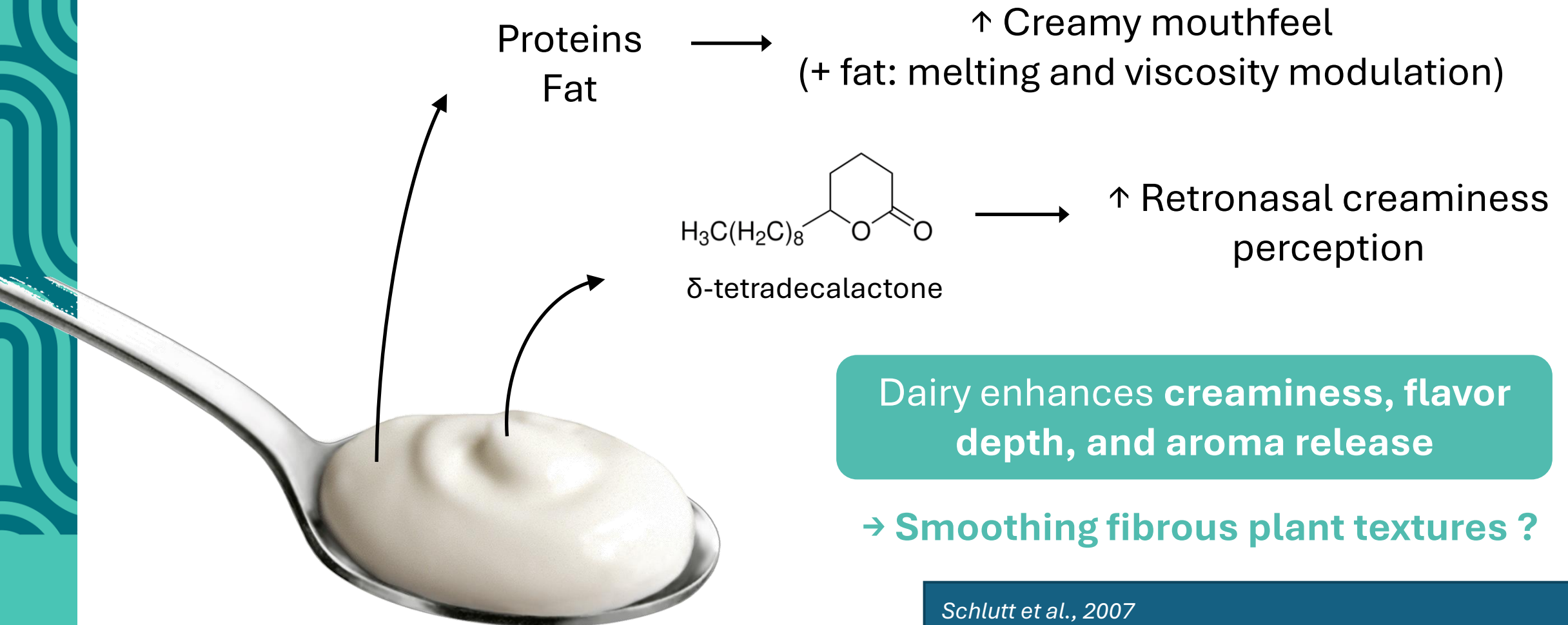
Dominance rates of each 6 attribute for each product

Products	Overall liking			Mouthfeel liking		
D1	5.2	± 1.4	a	5.6	± 1.2	ab
D2	5.7	± 1.4	a	6	± 1.2	a
P1	2.4	± 1.3	c	3	± 1.6	d
P2	3.8	± 1.8	b	4.6	± 1.8	c
P3	3.7	± 1.8	b	4.9	± 1.7	bc
P4	3.3	± 1.6	b	4.3	± 1.5	c
P5	3.3	± 1.7	b	4.4	± 1.5	c

Dairy as the 'Culinary Bridge' to Sustainable Diets

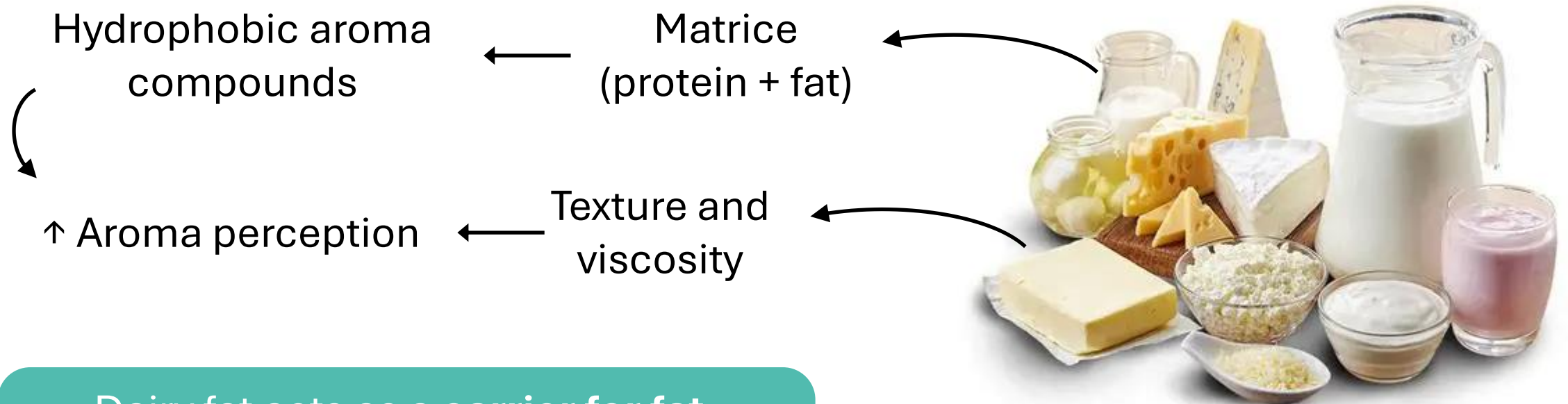
Sensory functions of dairy

Creaminess and Flavor Depth



Sensory functions of dairy

Dairy Carrier for Fat-Soluble Flavors

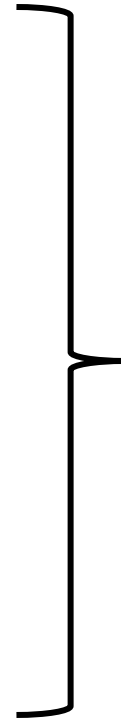


Dairy fat acts as a **carrier for fat-soluble flavours**, potentially improving plant flavour perception

Plant-Dairy pairings in Europe



+



Viscosity, firmness

Antioxidant activity

Sensory acceptability (+50%)



↑ Consumer acceptance

Traditional pairings (yogurt+fruit, cheese+vegetables, milk+cereal) reflect a culinary logic of **sensory complementarity**

Barrier reduction in plant-rich diets



Bland, astringent, or dry



↑ Mouthfeel, silkiness,
and viscosity

Dairy could reduce sensory barriers, making plant-rich diets more palatable

→ Integration of dairy + plants = enhanced sensory, nutritional, and culinary outcomes

Visible cheese and consumption of encouraged food groups in middle schoolers

Table 1. Food group servings consumed: Between group comparisons

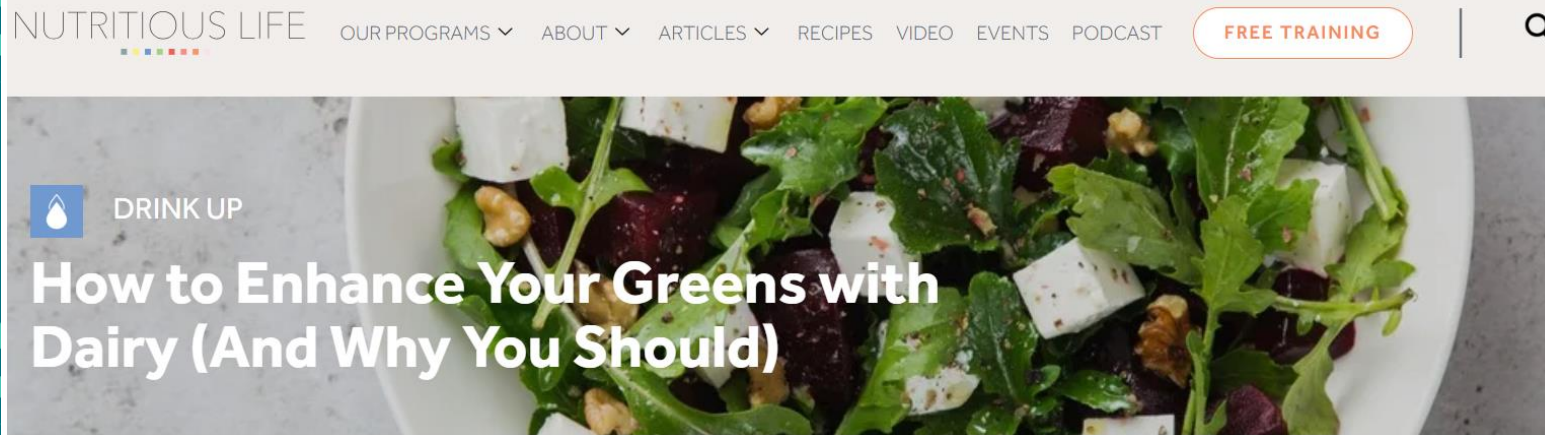
	Study 1		Study 2	
	VC	NC	VC	NC
Fruits	0.14 ± 0.39	0.20 ± 0.54	0.42 ± 0.58	0.14 ± 0.29*
Vegetables	0.33 ± 0.53	0.25 ± 0.51	0.33 ± 0.57	0.23 ± 0.51
Whole grains	0.72 ± 0.92	0.56 ± 0.95	2.84 ± 2.99	1.31 ± 1.95*
FGTE	1.19 ± 1.28	1.0 ± 1.36	3.59 ± 3.28	1.68 ± 2.13*

Note. Values are mean ± standard deviations. VC = visible cheese. NC = no cheese. FGTE = food groups to encourage.

*Significant between group difference ($p < 0.05$).



Culinary complementarity



Use Real Milk in These 7 Plant-Based Dinners



Dairy and Produce—A Perfect Pair



CONCLUSIONS

Conclusions

- **Sensory perception is a primary driver of eating behaviour**; people choose foods for pleasure first, nutrition second
- **Plant-rich sustainable diets face real sensory barriers** (dryness, astringency, muted flavour), which limit acceptance and adherence
- **Dairy's sensory and culinary qualities and versatility** can be a practical tool to help overcome acceptance barriers in plant-forward eating
- **Integrating sensory science into nutrition strategies** bridges the gap between dietary recommendations and real-world food choices
- **Sustainable diets must be pleasurable**; dairy can act as a *culinary bridge* that enhances enjoyment while supporting healthier, more sustainable eating patterns



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