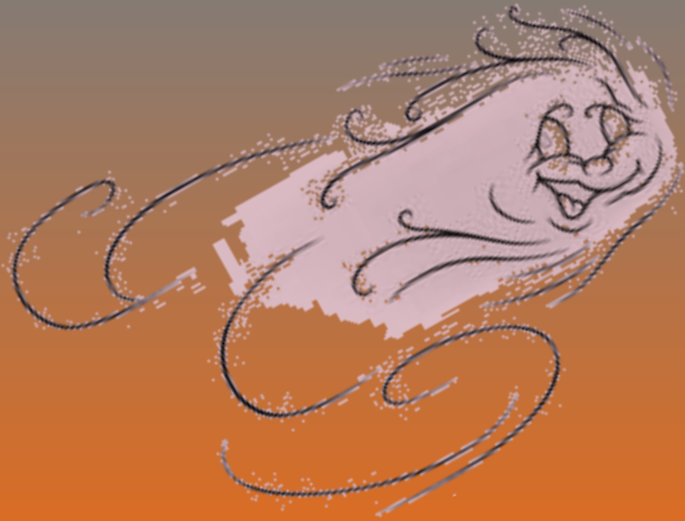
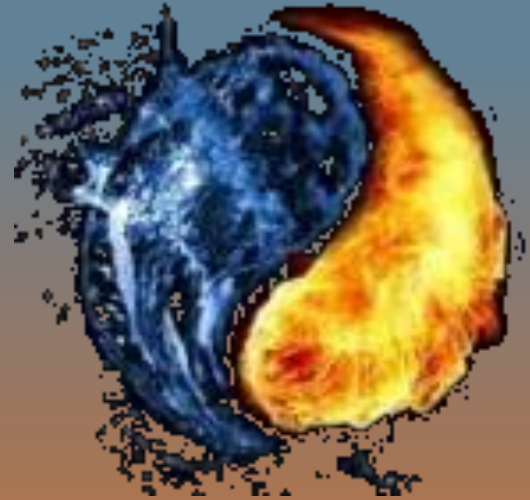


Neuroactive potential of the microbiota and its relevance to beauty



Patrizia A d'Alessio, MD PhD



No conflict of interest

What will be talking about?

How is MOOD connected to the skin ?
What have BACTERIA to do with this ?
Are gut-brain modules (GBM) involved ?
How does it WORK ?



The gut-brain axis driver of **QoL** & skin beauty

via microbe-microbe / microbe - host interactions



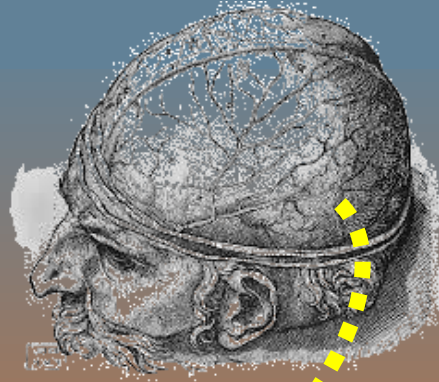
In connection with underlying silent inflammation



At the basis of

- chronic disease
- digestive disorders
- depression
- insomnia
- decrease of **beauty and fitness**

Mood is primordial



Mood is managed by
several actors in the body
:

The brain

The HPA-axis*

Cortisol

The gut barrier

The microbiota

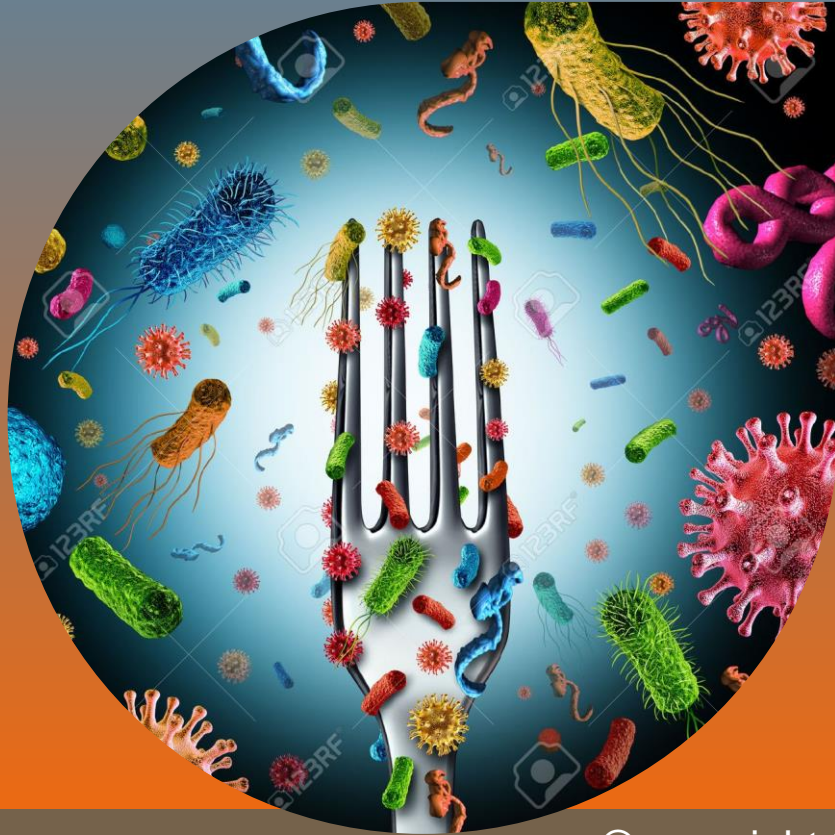
Mucosal immunity

The vagal system



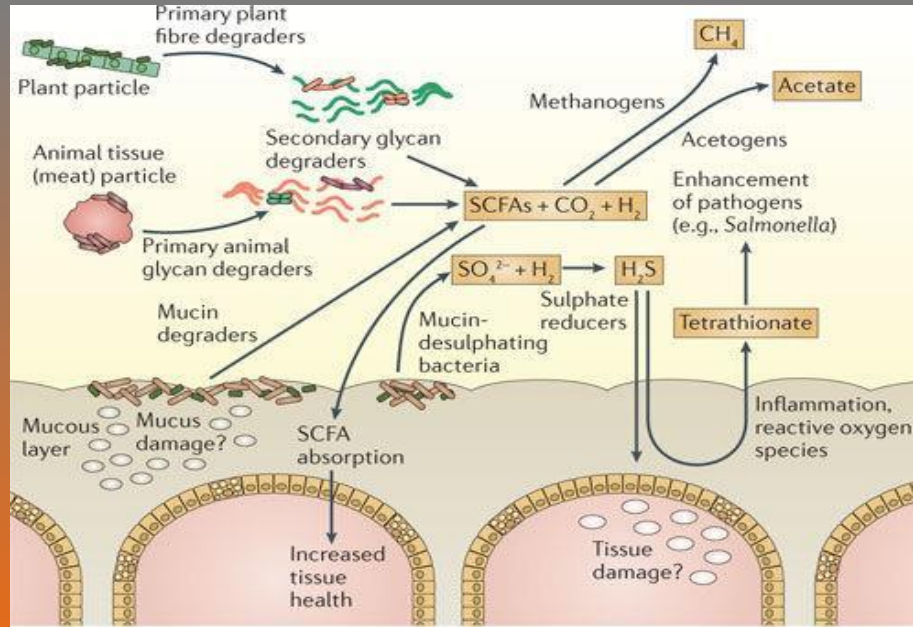
*hypothalamus-pituitary-adrenal

Bacteria are RECRUITED by eating paraphernalia



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Microbiota metabolites prevent aging & maintain beauty...



**Butyrate, Folate,
Propionate** produced
by:

Bifidobacteria
Clostridii
Enterobacterium
Enterococcus
Ruminococcus
Roseburia

Nature Reviews Microbiology, 2012;10:323–335

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Relationship between gut microbial metabolism and mental health

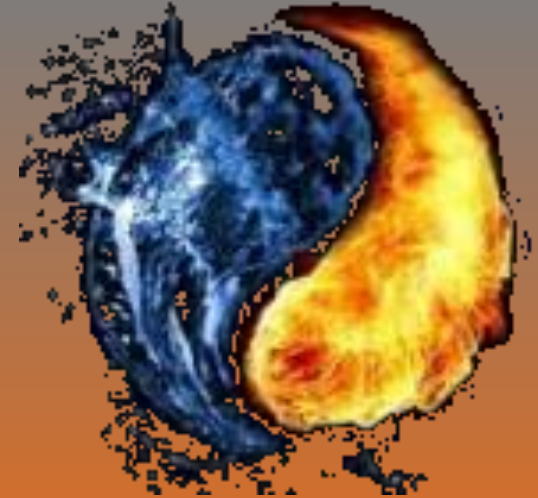
nature
microbiology

ARTICLES

<https://doi.org/10.1038/s41564-018-0337-x>

The neuroactive potential of the human gut microbiota in quality of life and depression

Mireia Valles-Colomer^{1,2}, Gwen Falony^{1,2}, Youssef Darzi^{1,2}, Ettje F. Tigchelaar³, Jun Wang^{1,2}, Raul Y. Tito^{1,2,4}, Carmen Schiweck⁵, Alexander Kurilshikov^{1,3}, Marie Joossens^{1,2}, Cisca Wijmenga^{1,3,6}, Stephan Claes^{5,7}, Lukas Van Oudenhove^{7,8}, Alexandra Zhernakova³, Sara Vieira-Silva^{1,2,9} and Jeroen Raes^{1,2,9*}



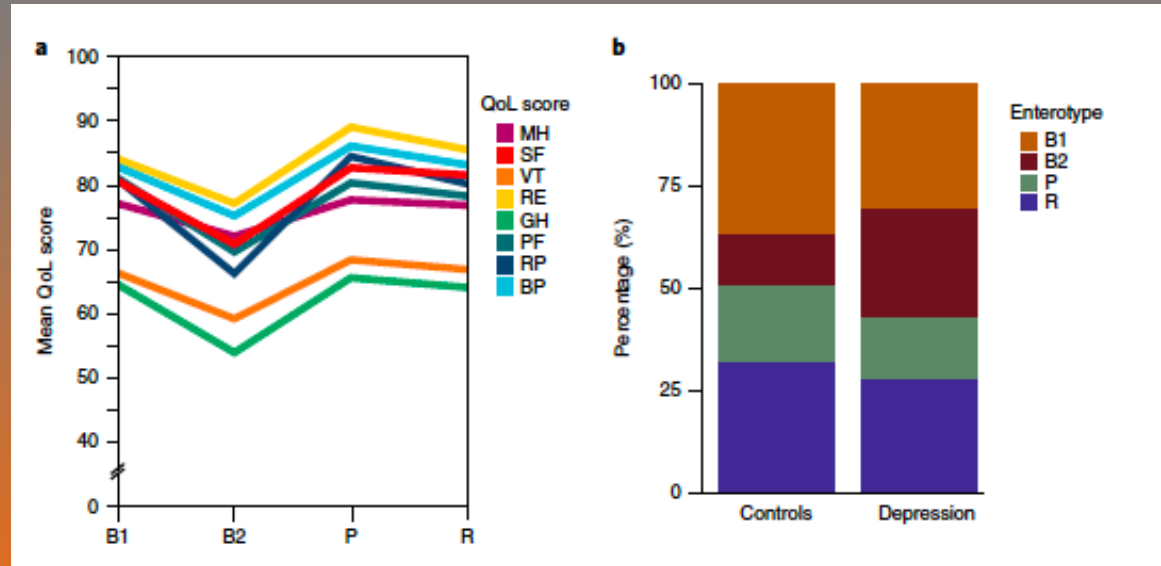
Bacterioides type 2 in association with lower QoL

Mental parameters

MCS = mental health;
MH = emotional well-being;
SF = social functioning;
VT = vitality.

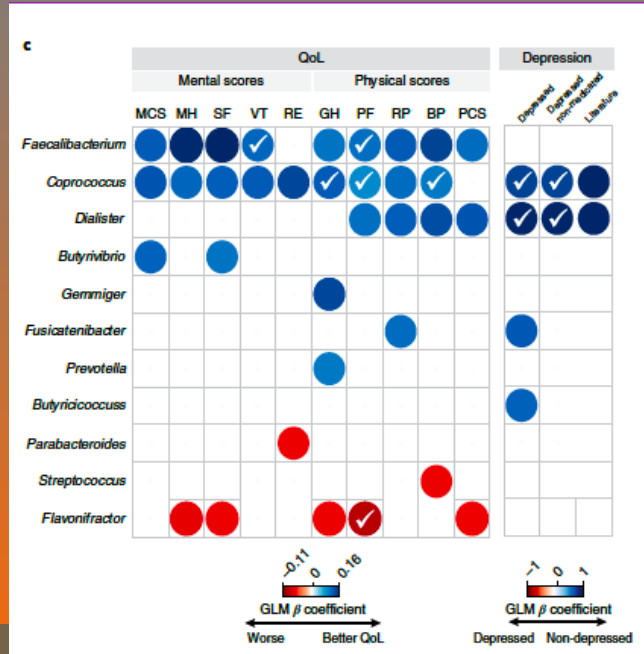
Physical parameters

GH = general perception ;
PF = physical functioning ;
RP = role limitations ;
BP = pain ;
PCS= « physical compliance score ».



QoL may be a MATTER of bacterial metabolites

Faecalibacterium & **Coprococcus** for
VITALITY, emotional well-being & Social functioning



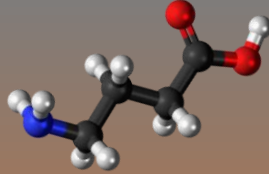
◆ **Faecalibacterium** and **Coprococcus**, among *the* producers of **propiobutyrate**, are associated to good QoL

◆ **Coprococcus** spp are diminished in case of depression even after correction for the effects of anti-depressants.

Gut-Brain Modules (GBM)

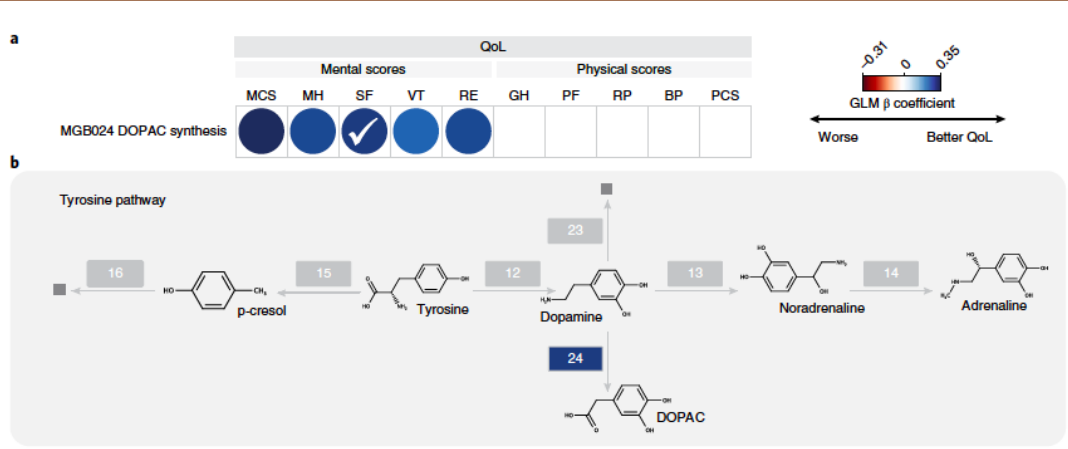
Single neuroactive components production / degradation

- ◆ **GABA** (γ aminobutyric acid) and **tryptophan** metabolism are enriched in human gut-associated microorganisms.



- ◆ **CNS** : overstimulations, is inhibiting neuromodulator,
- ◆ **Periphery** : visceral pain inhibitor

- ◆ **DOPA** synthesis generating **dopamine** metabolite **DOPAC**
- ◆ anti-proliferative colon cancer
- ◆ marker for Parkinson's disease



Mood also depends on the quality of the gut barrier

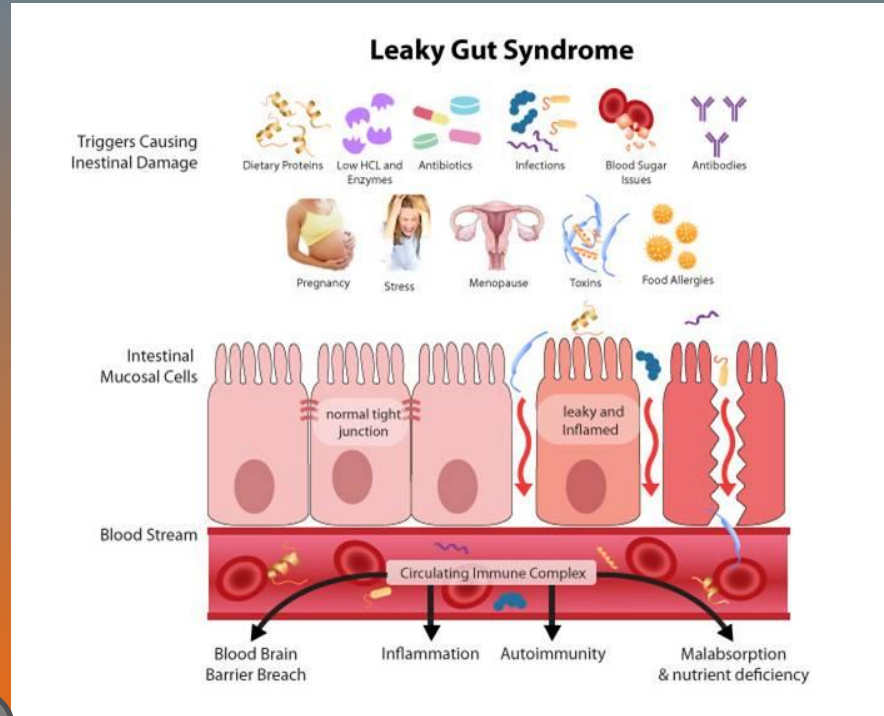
loss of memory,
anxiety
refusal to meet social events,
obsessive thoughts
difficulty to concentrate,
depression
chronic fatigue syndrome,
sleeplessness,
loss of interest,
obsessive neurosis



Barrier dysfunction = DYSBIOSIS

Cortisol

Mood disorders



« The relationship between gut microbial metabolism, mental health and skin »

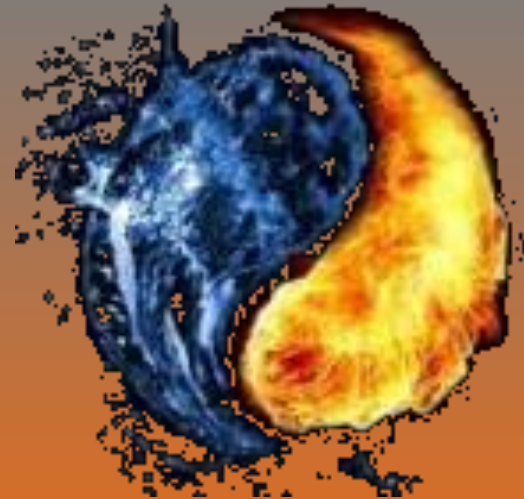
PERSPECTIVE

Neuroimmunology of Stress: Skin Takes Center Stage

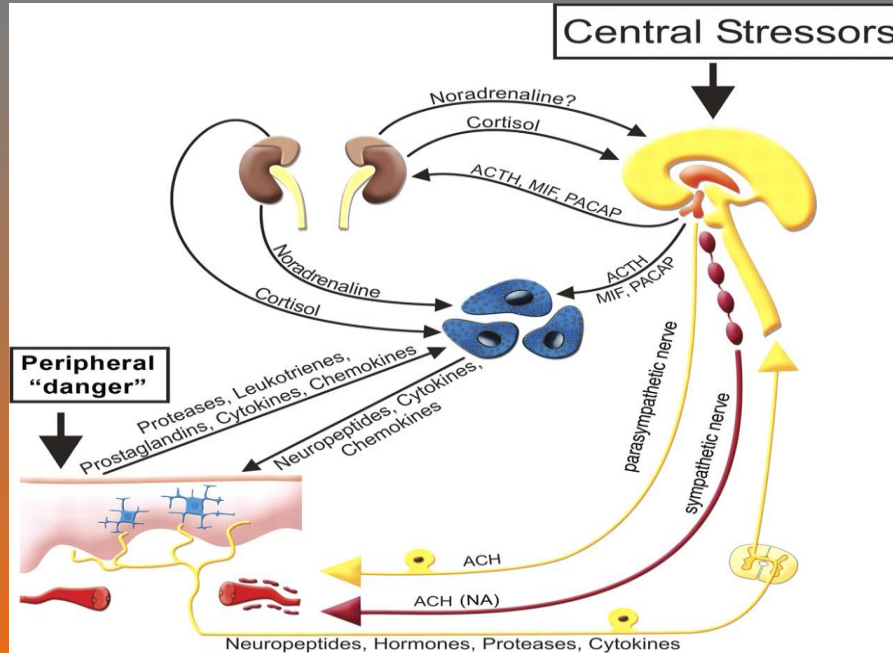
Petra C. Arck¹, Andrzej Slominski², Theoharis C. Theoharides³, Eva M. J. Peters¹ and Ralf Paus⁴

Like few other organs, the skin is continuously exposed to multiple exogenous and endogenous stressors. Superimposed on this is the impact of psychological stress on skin physiology and pathology. Here, we review the "brain-skin connection," which may underlie inflammatory skin diseases triggered or aggravated by stress, and we summarize relevant general principles of skin neuroimmunology and neuroendocrinology. Specifically, we portray the skin and its appendages as both a prominent target of key stress mediators (such as corticotropin-releasing hormone, ACTH, cortisol, catecholamines, prolactin, substance P, and nerve growth factor) and a potent source of these prototypic, immunomodulatory mediators of the stress responses. We delineate current views on the role of mast cell-dependent neurogenic skin inflammation and discuss the available evidence that the skin has established a fully functional peripheral equivalent of the hypothalamic-pituitary-adrenal axis as an independent, local stress response system. To cope with stress-induced oxidative damage, the skin and hair follicles also express melatonin, probably the most potent neuroendocrine antioxidant. Lastly, we outline major, as-yet unmet challenges in cutaneous stress research, particularly in the study of the cross-talk between peripheral and systemic responses to psychological stress and in the identification of promising molecular targets for therapeutic stress intervention.

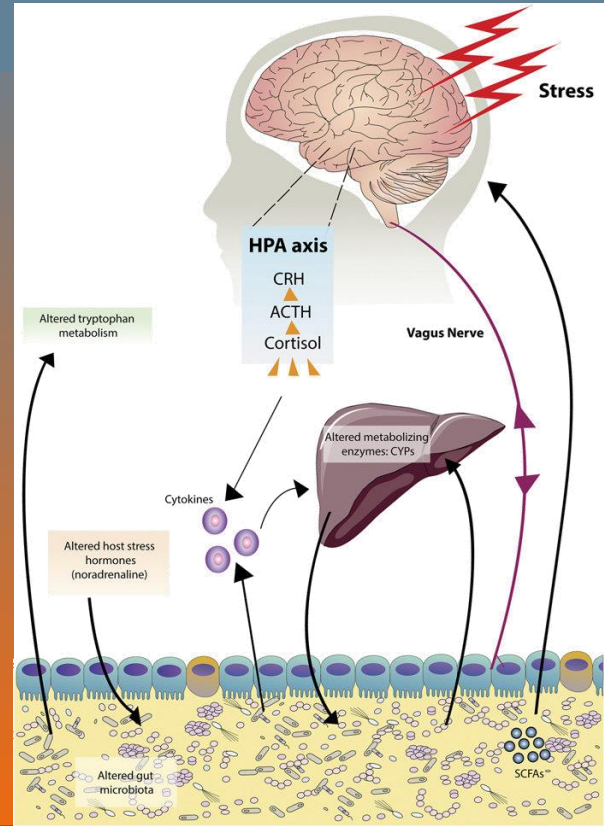
Journal of Investigative Dermatology (2006) 126, 1697–1704. doi:10.1038/sj.jid.5700104



The brain-gut connexion is CONCOMITANT to the brain-skin connexion



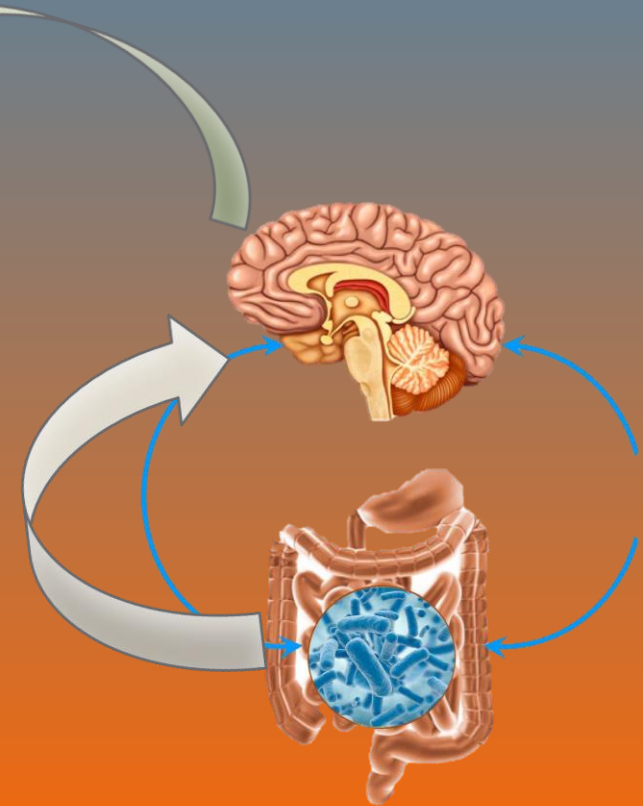
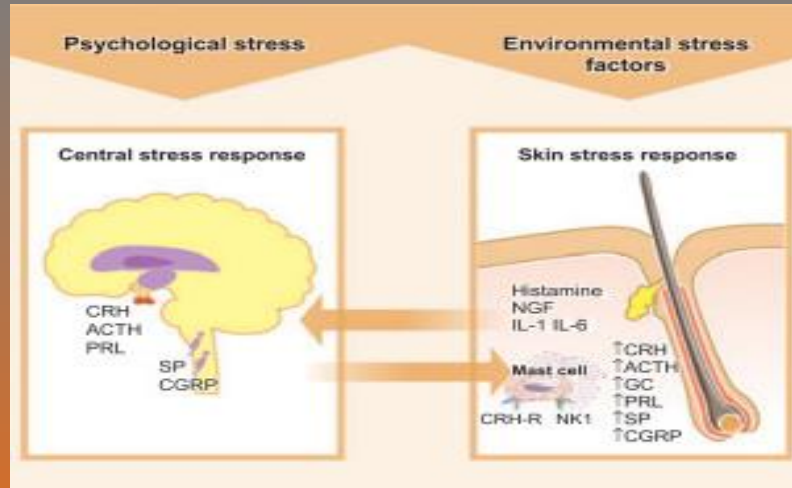
Bioengineering in Wound Healing: A Systems Approach (book), 2017



Pharmacological Reviews 2019;71:198-224

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The brain whispers microbiota secrets to the skin



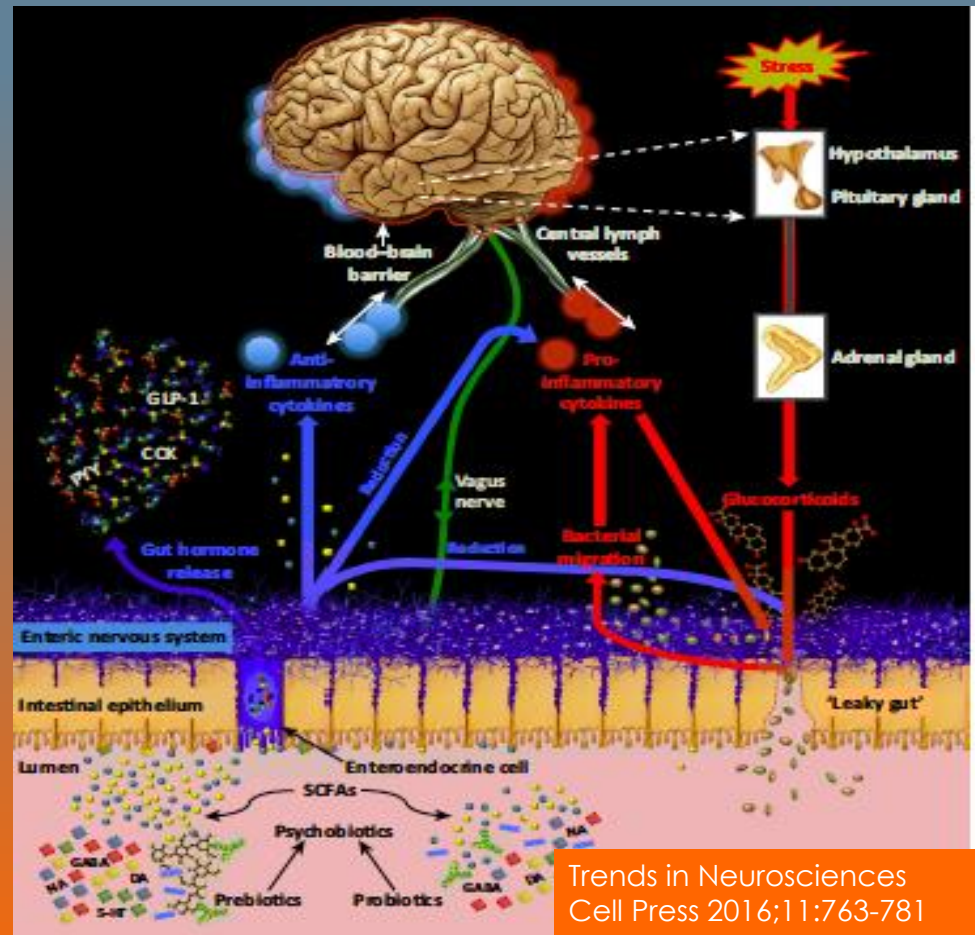
Neuroimmunology of Stress: Skin Takes Center Stage

Petra C. Arck¹, Andrzej Slominski², Theoharis C. Theoharides³, Eva M. J. Peters¹ and Ralf Paus⁴

Journal of Investigative Dermatology (2006) 126, 1697-1704. doi:10.1038/sj.jid.5700104

PSYCHOBIOOTICS

- ◆ Pre-and probiotics compose **psychobiotics**
- ◆ induce short chain fatty acids (SCFA)
- ◆ Provide anti-inflammation in gut and skin
- ◆ « *bacterial taxa are potential leads for **psychobiotics**—confering health benefits in patients suffering from **psychiatric illness*** »



Food – BACTERIA – metabolites & neuromodulators



... can contribute to mood modulation and skin rejuvenation

Galen (129-216) physician of emperor Marc Aurel

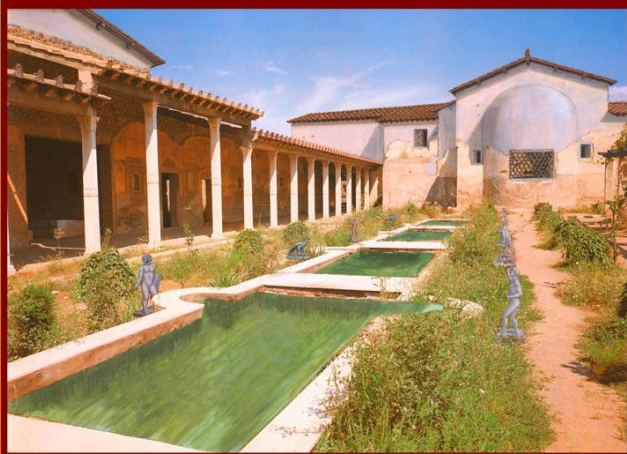
In describing the effects of his fasting diet, recommended the use of a large variety of nutrients, such as lettuce, peaches and hiacynthus... without knowing they contained neurotransmitters, such as GABA and DOPA.



« In case you fall ill, follow this diet and in half of the cases you will not need any other remedy. »

The first skin probiotic treatment

Roman poets Horace and Cato related about anti-aging masks prepared with young **alligators (green) feces aka microbiota** imported from Alexandria...in the first anti-aging SPA of JULIA FELIX in POMPEI



Julia Felix House, Pompeii



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Inflammation of the **skin** CAN be treated repairing barrier dysfunction of the **gut**



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The gut barrier directly influences the skin

Barrier function restoration

Table 1

AISA: significant effect on **strengthening the epithelial barrier function**

	Control	AISA			
		75 μ M	150 μ M	750 μ M	1500 μ M
R ^a	107 \pm 3%	106 \pm 4%	112 \pm 3%	132 \pm 3%	153 \pm 4%
n	9	6	6	6	6
p		n.s.	n.s.	<0.001	<0.001

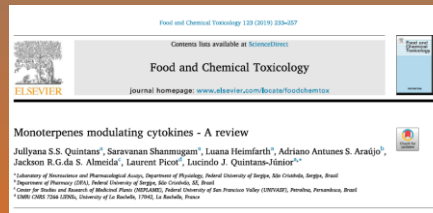
Evaluation of the electrical resistance (Ω CM²)
percentage of the initial resistance : Rt

Life Sciences **2013**;92:1151-1156



Review Terpenoids as Potential Geroprotectors

Ekaterina Proshkina ^{1,2}, Sergey Plyusnin ^{1,2,3}, Tatyana Babak ¹, Ekaterina Lashmanova ¹, Faniya Maganova ², Liubov Koval ^{1,2}, Elena Platonova ^{1,2}, Mikhail Shaposhnikov ¹ and Alexey Moskalev ^{1,2,4,5}

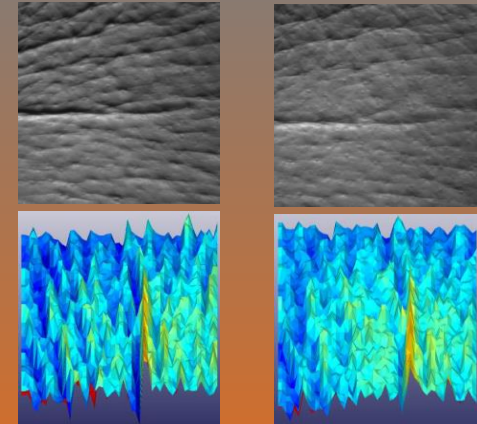


Monoterpenes modulating cytokines - A review

Jullyana S.S. Quintans^a, Saravanan Shanmugam^a, Luana Heindrich^a, Adriano Antunes S. Araújo^b, Jackson R.G. da S. Almeida^c, Laurent Picot^d, Lucindo J. Quintans-Junior^{a,e}

^aLaboratory of Bioactive and Pharmacological Analysis, Department of Physiology, Federal University of Sergipe, São Cristóvão, Sergipe, Brazil
^bDepartment of Pharmacy (DFA), Federal University of Sergipe, São Cristóvão, SE, Brazil
^cCenter for Studies and Research of Molecular Plant (CEMP/MS), Federal University of São Francisco Valley (UNIFRAV), Petropolis, Pernambuco, Brazil
^dUMR 1085 CBM 1204 LERF, University of La Rochelle, France
^eUMR 1085 CBM 1204 LERF, University of La Rochelle, France

Before After



PRIME **2015**;11:19-25

Protect & repair the gut barrier !

Are nutraceuticals an option
for skin embellishment ?



INTERMEDIATE PSORIASIS



D0

D45

Global Journal of Dermatology & Venereology, 2015, 3, 1-4

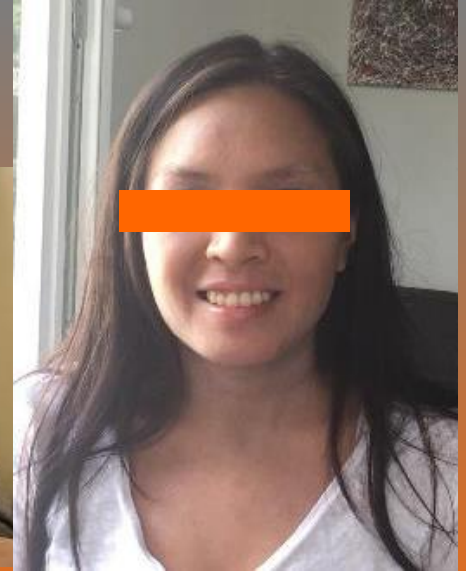
Med-cosmetics the new trend



Day 0



Day 56



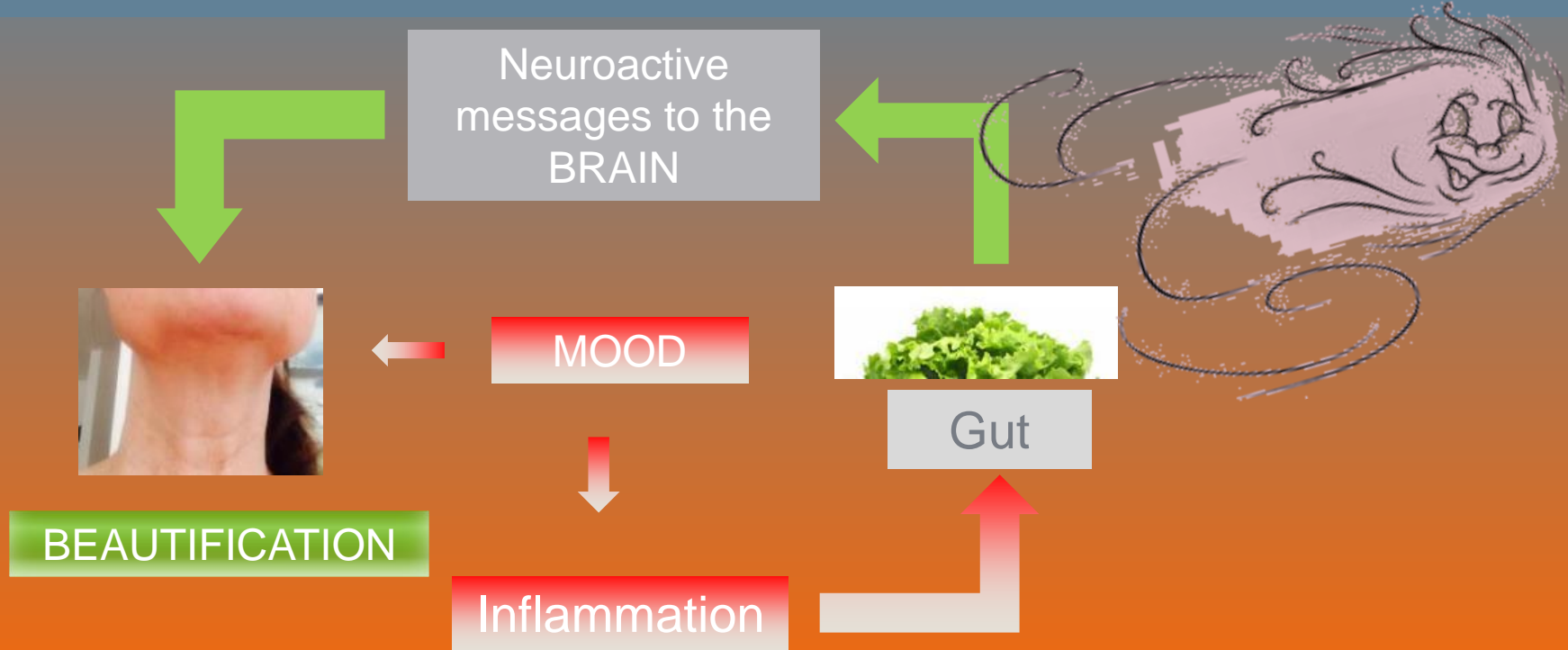
CONTROLLED & CERTIFIED BY A SK TECHNOLOGY



SUITABLE TO ALL SKIN TYPES

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YOUR microbiota neuroactive potential INFLUENCES YOUR skin QUALITY...



TAKE HOME MESSAGES



Stay on the sunny side

Protect & repair your gut barrier

→ stop inflammation

→ enhancement QoL bacteria

→ amelioration of your mood

= **embellishment of your skin**

Life Sciences **2013**;92:1151-1156; Global Journal of Dermatology & Venereology, **2015**, 3, 1-4;
Clinical Nutrition **2016**;35:812-818; Nutrients **2020**;12,800; AIMS Molecular Science **2022** 9 (2): 46-65.



Thank you for your attention
Questions & Credits



Consiglio Nazionale delle Ricerche
Institute of Genetics and Biophysics
Adriano Buzzati-Traverso

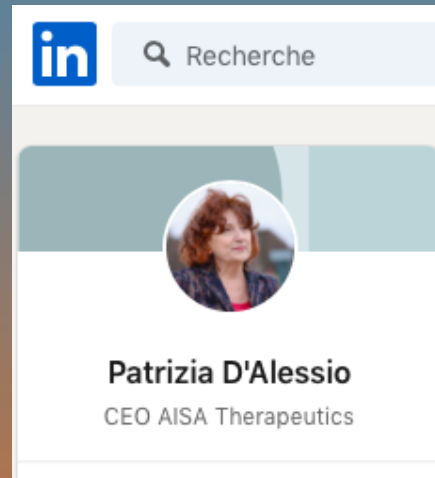


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Patrizia D'Alessio



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AISA Therapeutics

Médecine et
santé

8 me