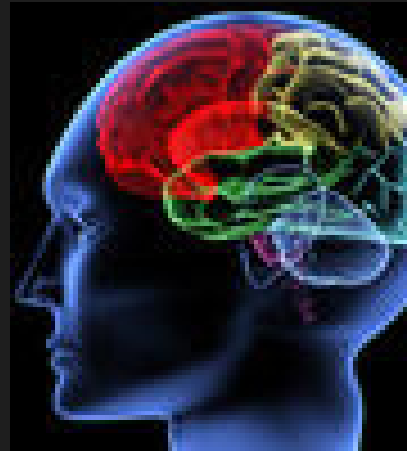


Goût, odorat et Nutrition



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Chemosensory perception

- Olfaction orthonasal
- Olfaction retronasal
- Gustatory perception
- Tactile, sensory, ...

Multisensory perception involving cranial
nerve I, V2, IX, X, VIIb

Hunger - Satiety

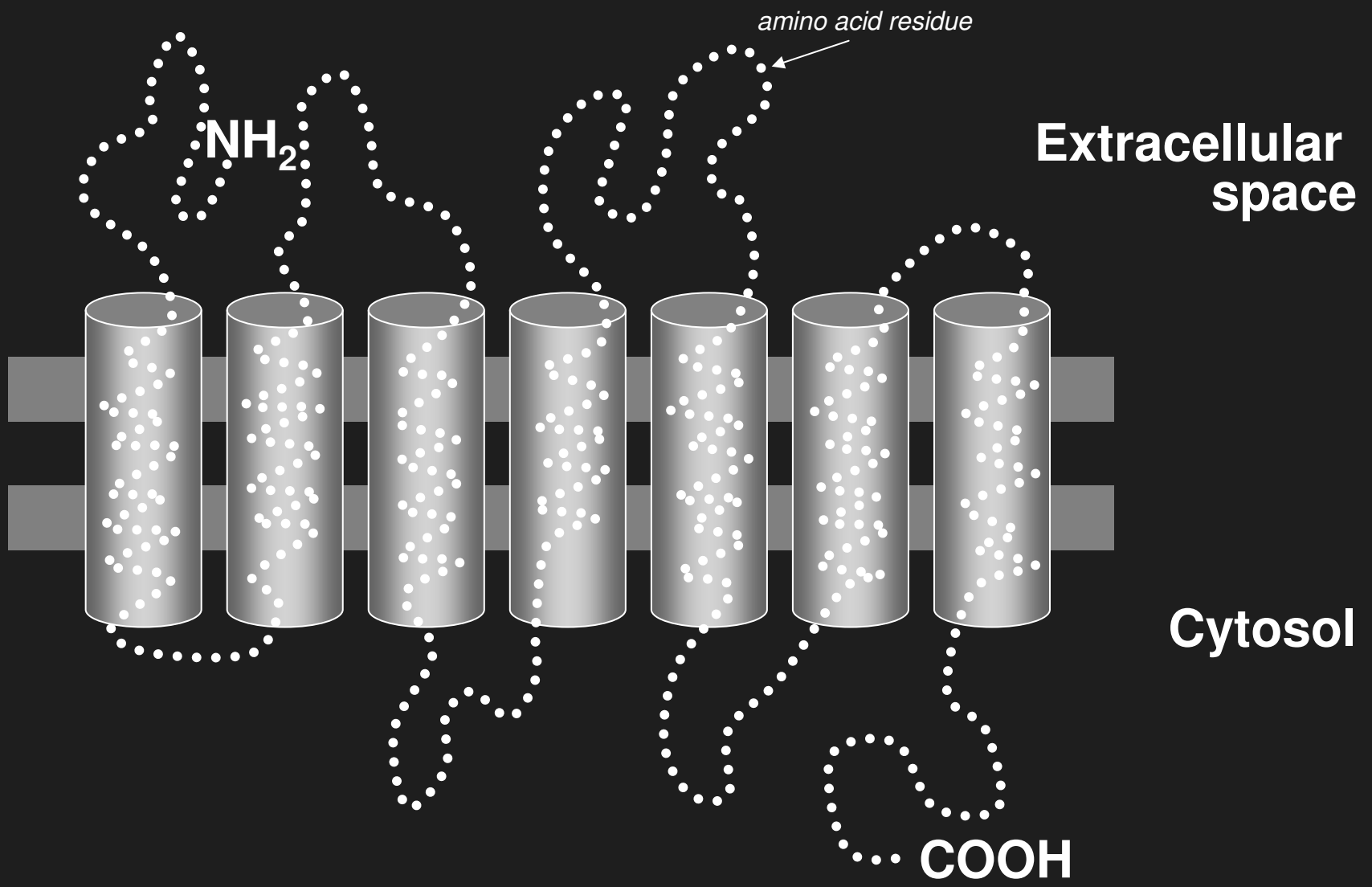
- Digestive tube and hormones
Negative feedback with peptide secretion
Cholecystokinin (CCK)
- Glucose and Insulin blood level
- Hypothalamus : lateral and ventromedian
- Connections to chemosensory centers
 - to amygdala
 - to prefrontal cortexcognitive factors :
food preference and aversive gustatory comportment

Nutritional implications

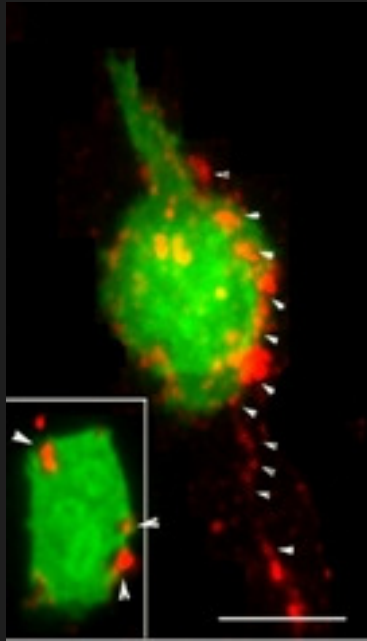
- Olfaction is viewed as instrumental in locating foods in the environment
- Taste is regarded as the final gatekeeper for ingestive decisions
 - sweetness : carbohydrates
 - saltiness : ions and electrolytes
 - umami : protein
 - sourness : acids
 - bitterness : toxic or harmful agents

Nutritional implications

- Sensory function and food selection
 - provision of adequate nutrition without oronasal chemosensory stimulation (e.g. total parental nutrition) commonly does not result in complete satiety.
 - use of high-intensity sweeteners and fat replacement have not led to reduced consumption of sugar, fat or total energy.



Protein G à 7 domaines transmb

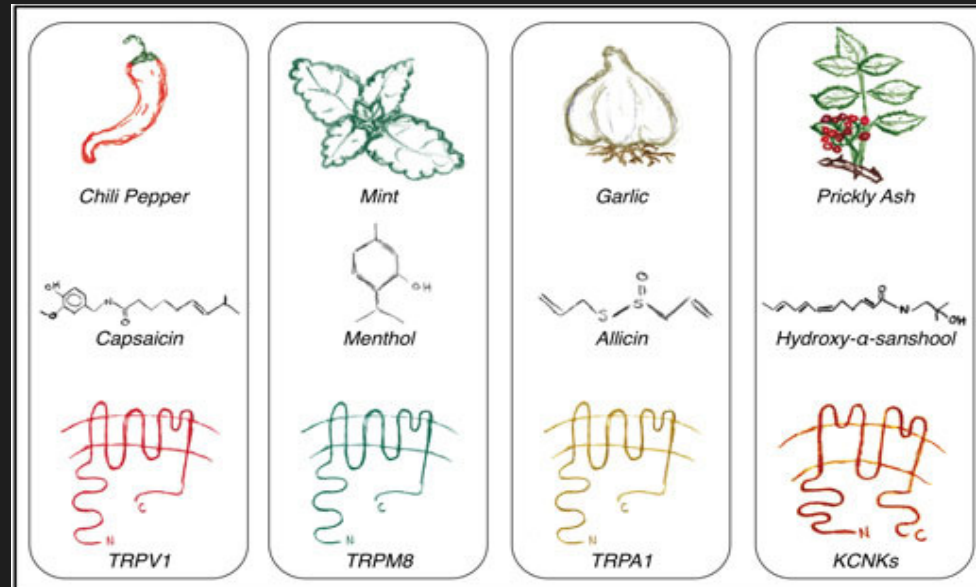


SCrC in green
Substance P in nerve ending in red

Solitary chemoreceptor cells
Oral and nasal mucosa
Respones to vapor-phase irritant chemicals

Stimulation of nasal trigeminal chemoreceptors

- Pungent sensation
- tingling
- stinging
- burning
- cooling
- warming
- painful
- irritating





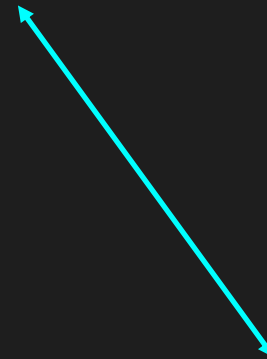
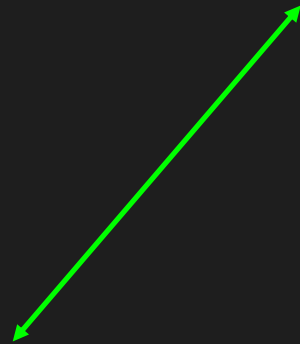


Assesment of sensory function

Psychophysical testing

Morphology

Neuronal Activity

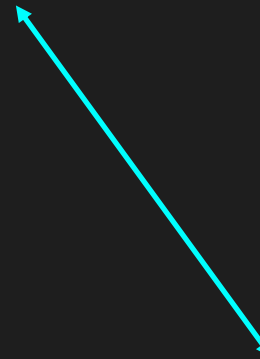
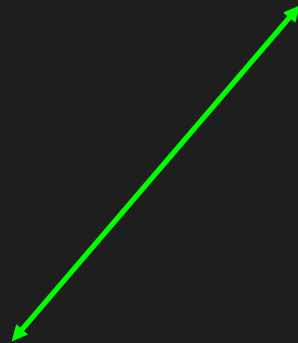


Assesment of chemosensory function

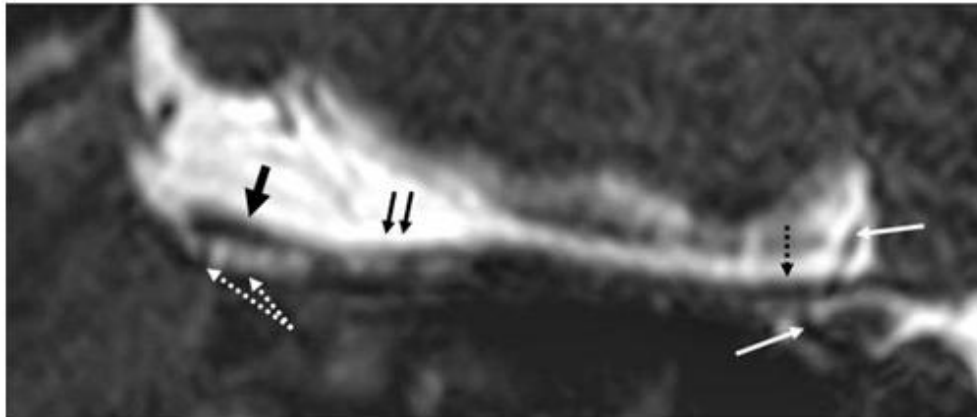
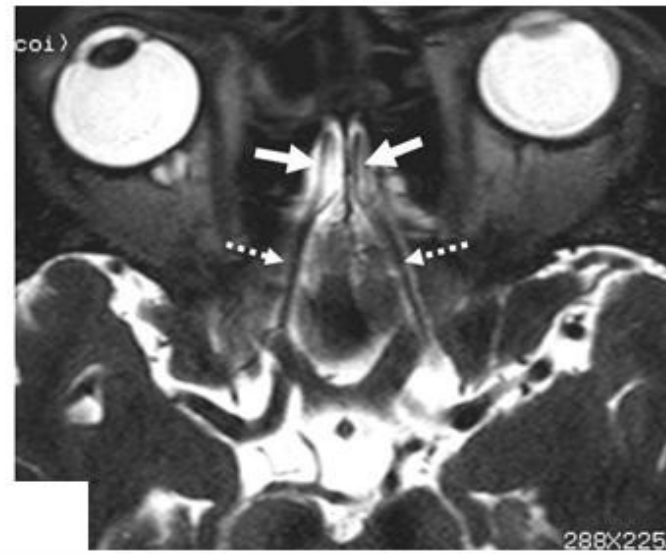
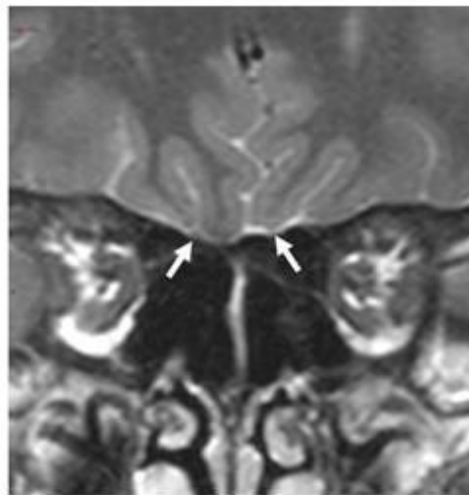
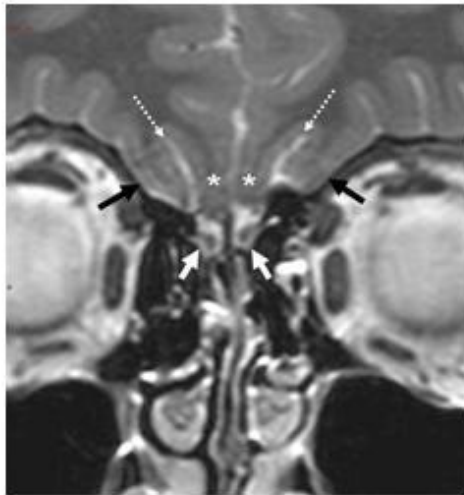
Psychophysical testing
Orthonasal - Retronasal

MRI Olfactory
Bulb volume

Chemosensory
Event Related Potentials



MRI Olfactory Bulb volume



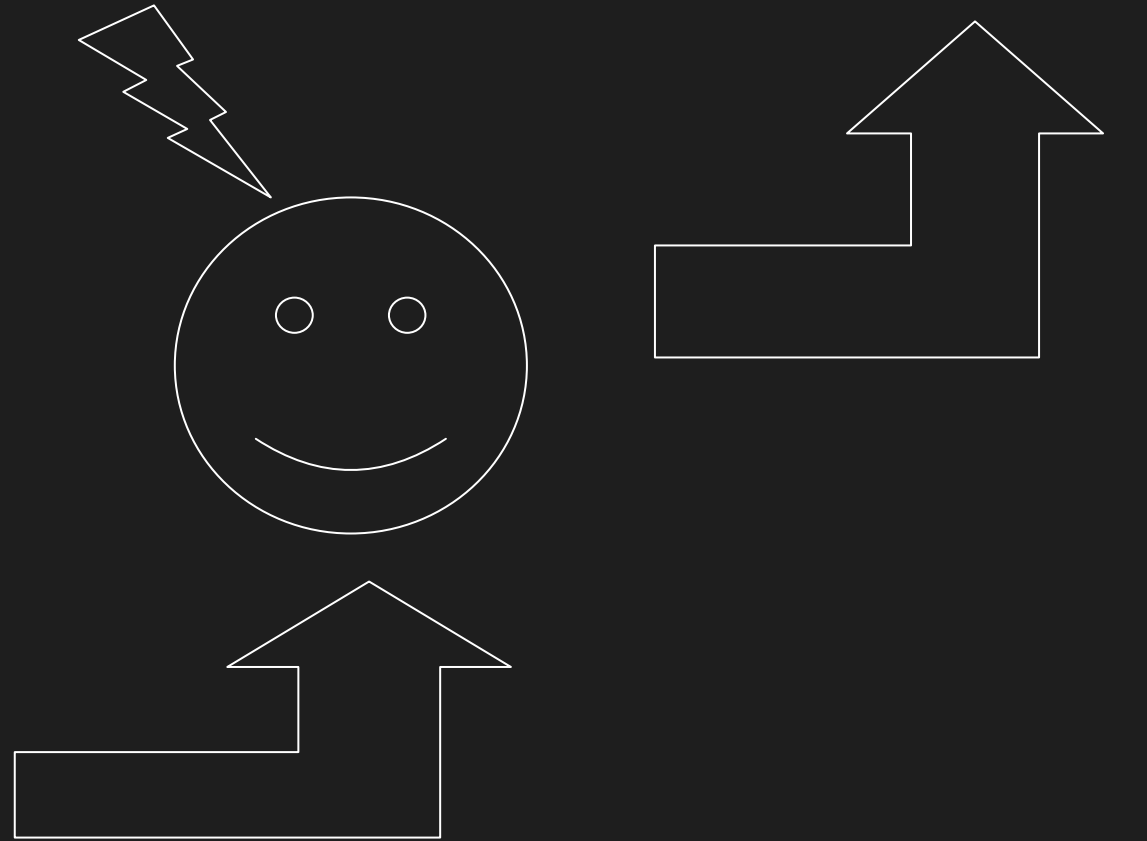
Chemosensory Event Related Potentials

Recording

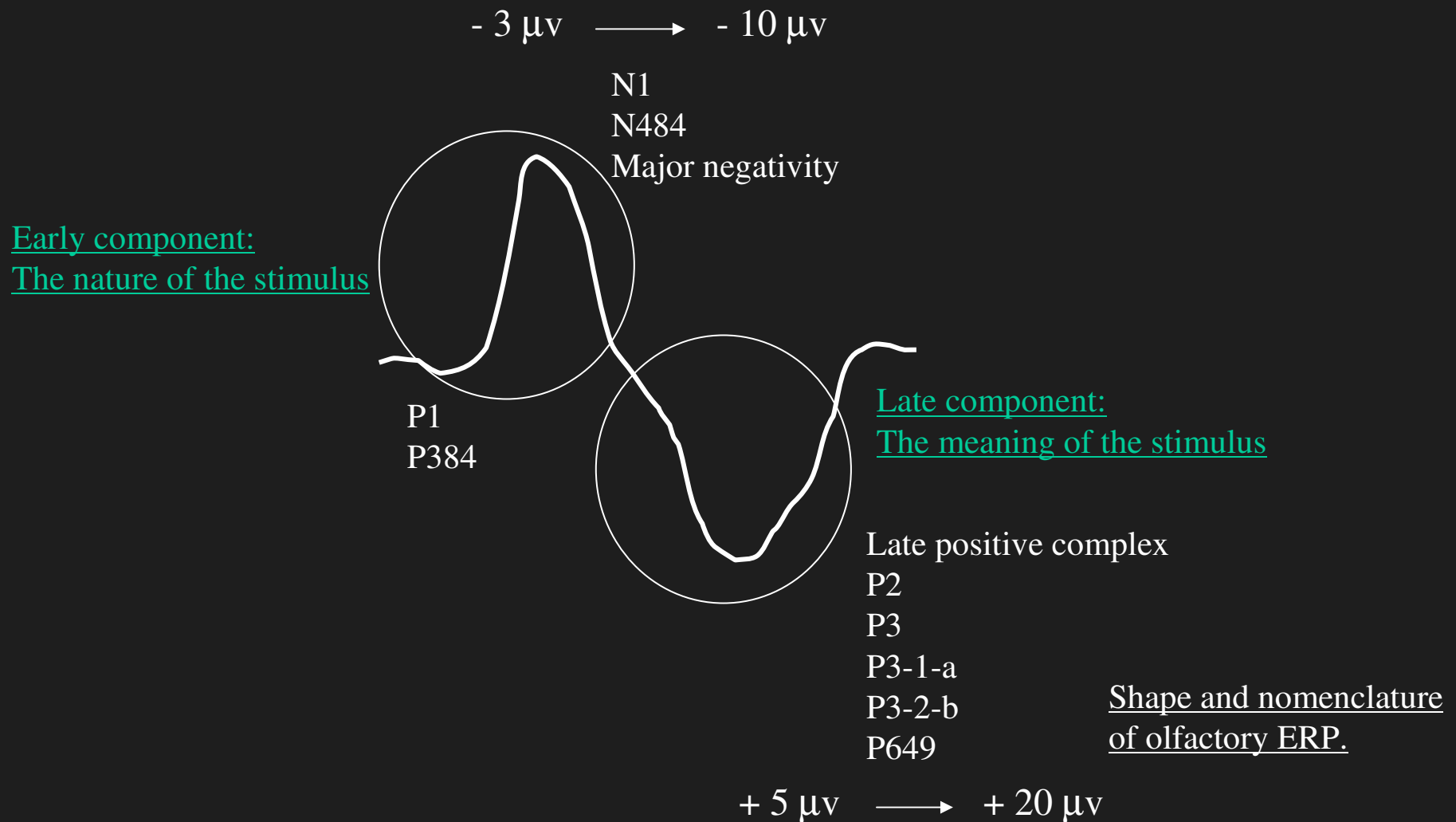
Analysis



Stimulation

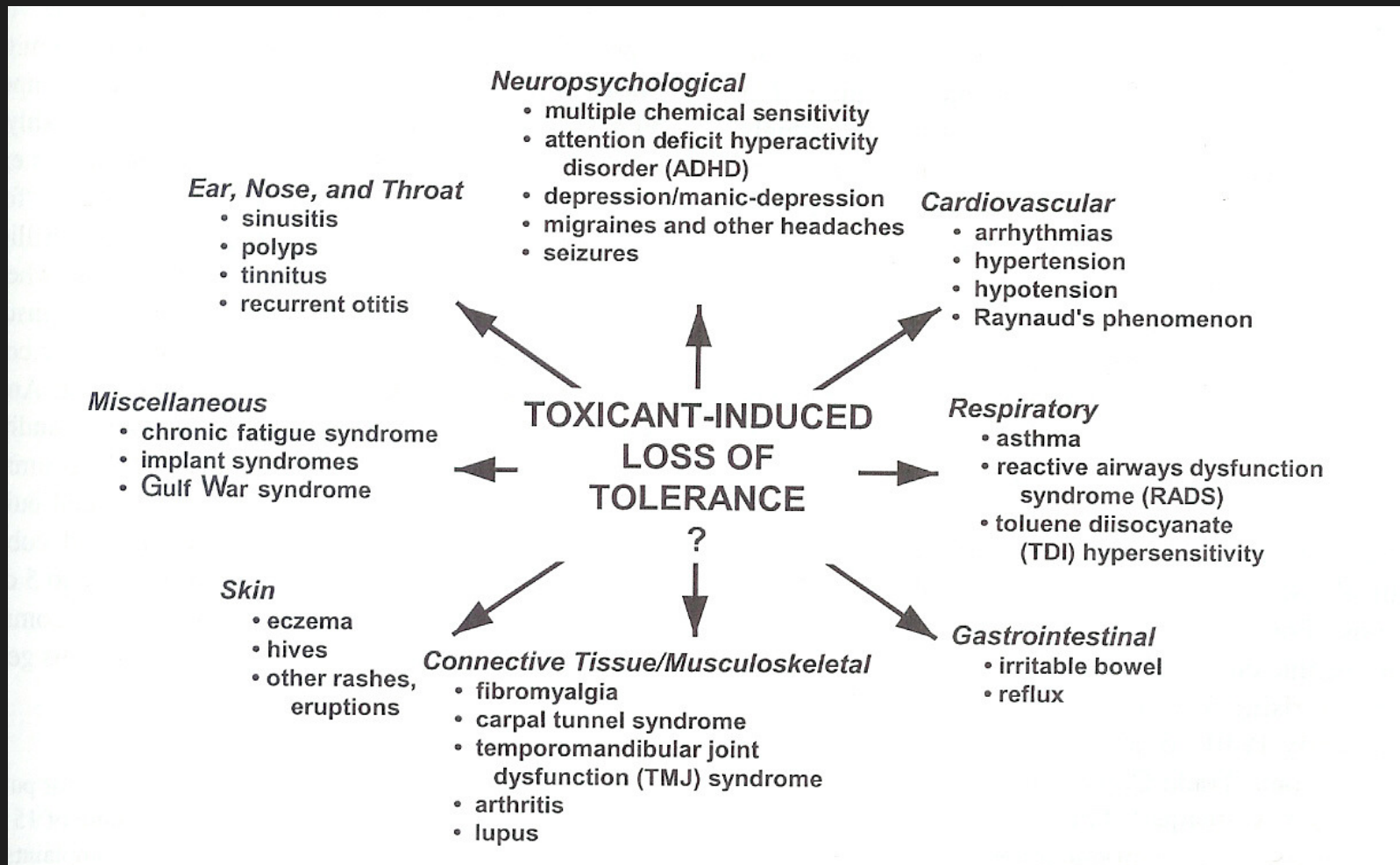


ChemoSensory Event Related Potentials



Psychophysical orthonasal testing	Olfactory ERPs	Conclusion
Normosmia	Present	Normal olfactory function
Normosmia	Absent	Possibly normal olfactory function, consider the possibility of a technical problem (EEG artefacts, ...).
Hyposmia	Present	Decreased olfactory function. (the presence of OERPs may be correlated with a good prognosis)
Hyposmia	Absent	Decreased olfactory function. (the absence of OERPs may be correlated with a bad prognosis)
Anosmia	Present	Consider patient malingering
Anosmia	Absent	Severely altered olfactory function, bad prognosis.

Multiple Chemical Intolerance



Chemosensory event-related potentials in alcoholism: A specific impairment for olfactory function

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Alcoholic and controls individuals' results for behavioural olfactory measures: mean (S.D.).

Group	Orthonasal testing				Retronasal testing (% correct) ^a
	OT ^{a/NS}	OD ^{b/NS}	OI ^{c/**}	TDI ^{d/**}	
Controls (N=10)	5.65 (0.63)	12.3 (1.76)	12.3 (0.94)	30.5 (1.93)	72.3 (10.21)
Alcoholics (N=10)	5.55 (1.04)	12.4 (2.27)	10.4 (1.71)	27.25 (2.91)	60.66 (13.5)

NS, non-significant.

^a Odor threshold score (0–16).

^b Odor discrimination score (0–16).

^c Odor identification score (0–16).

^d Threshold–discrimination–identification global score (0–48).

^{*} $p < .05$.

^{**} $p < .01$.

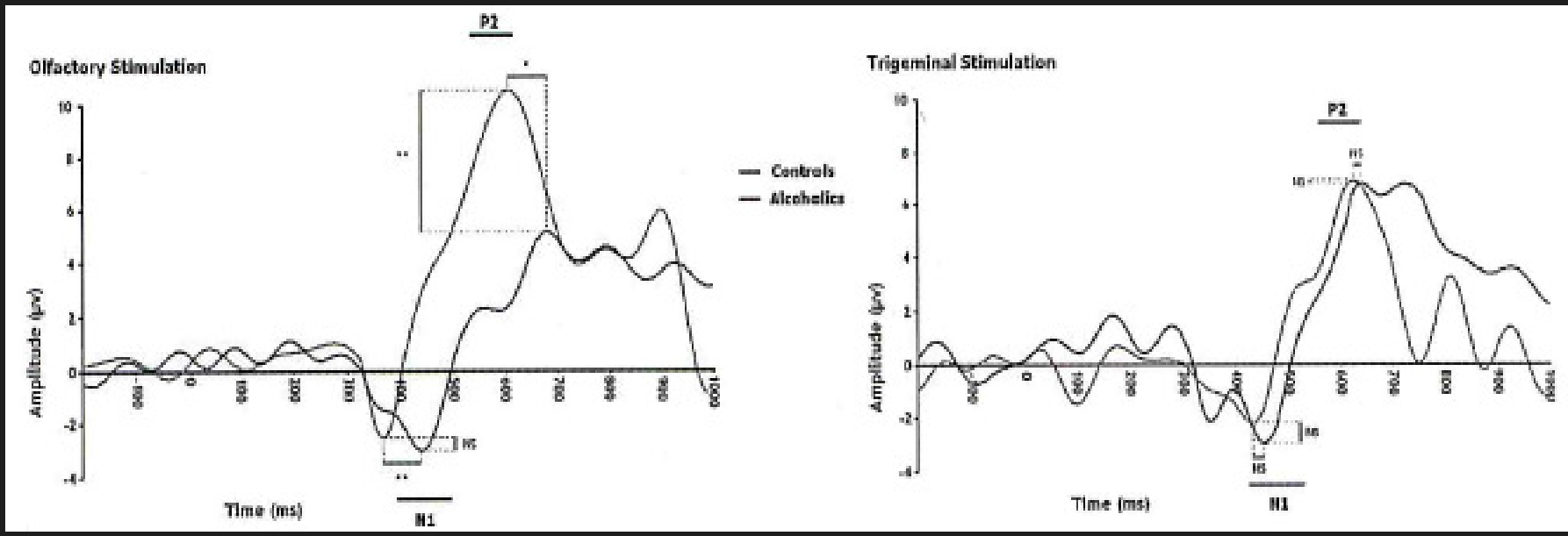


Table 3
Electrophysiological results: mean latencies [ms (S.D.)] and amplitudes [µV (S.D.)] for each electrode (Fz, Cz, Pz) and each stimulus type (olfactory, trigeminal) for N1 and P2 components, among control and alcoholic groups.

		N1						P2					
		Olfactory			Trigeminal			Olfactory			Trigeminal		
		Fz	Cz	Pz	Fz	Cz	Pz	Fz	Cz	Pz	Fz	Cz	Pz
Controls (N=10)	Latency	374 (48.2)	372 (48.8)	372 (37.5)	440 (49.4)	448 (46.5)	444 (53.9)	545 (64.1)	577 (62.8)	558 (78.7)	627 (79.4)	623 (69.5)	621 (66.8)
	Amplitude	-2.55 (3.16)	-3.28 (2.55)	-2.21 (2.16)	-1.98 (2.79)	-2.63 (2.42)	-2.29 (1.21)	13.64 (6.16)	11.8 (4.23)	5.97 (3.47)	9.83 (5.22)	7.35 (2.94)	3.91 (2.01)
Alcoholics (N=10)	Latency	454 (88.1)	455 (69.5)	464 (64.1)	458 (87.2)	465 (78.5)	464 (87.1)	662 (84.3)	659 (83.4)	658 (81.2)	649 (87.9)	655 (88.6)	637 (79.4)
	Amplitude	-4.56 (3.32)	-4.21 (2)	-2.05 (1.33)	-3.08 (3.01)	-2.99 (2.19)	-3.32 (2.62)	6.03 (3.05)	5.6 (1.58)	3.45 (2.02)	9.57 (8.41)	7.9 (4.31)	3.44 (3.41)

Olfactory Impairment Is Correlated with Confabulation in Alcoholism: Towards a Multimodal Testing of Orbitofrontal Cortex

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	Controls (N = 20)	Alcoholics (N = 20)
Olfaction		
Odor Threshold score (0-16) ^{NS}	5.82 (0.67)	5.65 (0.97)
Odor Discrimination score (0-16) *	13 (1.68)	11.8 (1.96)
Odor Identification score (0-16) ***	12.75 (0.91)	10.85 (1.89)
TDI Global score (0-48) ***	31.5 (2.05)	28.25 (3.46)
Retronasal Testing (% correct) ***	72.1 (9.77)	56.1 (12.18)
Executive functions		
<i>Stop Signal Task</i>		
Performance Block 1 (% correct) ^{NS}	95.89 (3.39)	93.78 (5.97)
Reaction Times Block 1 (ms) **	606 (71.8)	717 (164.4)
Performance Block 2 (% correct) ^{NS}	91.41 (6.97)	83.65 (16.21)
Reaction Times Block 2 (ms) *	705 (89.12)	798 (150.7)
Stop Signal Index ^{NS} (% resp. to stop trials)	27.9 (18.62)	32.7 (22.17)
<i>Confabulation Task</i>		
Number of Hits Block 1 ^{NS}	39 (0.85)	38.55 (1.84)
Number of False Positive Block 1 ^{NS}	3.15 (2.74)	2.55 (2.26)
Reaction Times Block 1 (ms) **	786 (122.8)	1008 (285.3)
Number of Hits Block 2 ^{NS}	36.37 (2.49)	37.05 (2.61)
Number of False Positive Block 2 *	3.89 (2.64)	7.85 (7.17)
Reaction Times Block 2 (ms) *	774 (118.9)	932 (282.1)
Temporal Context Confusion Index **	0.032 (0.071)	0.145 (0.167)

NS = non-significant;

*p<0.05 ;

**p<0.01 ;

***p<0.001

doi:10.1371/journal.pone.0023190.t002

		Odor Threshold	Odor Discrimination	Odor Identification	TDI Global Score	Retronasal Testing
SSI¹	Controls	-0.35 (N.S.)	-0.02 (N.S.)	0.14 (N.S.)	0.04 (N.S.)	0.11 (N.S.)
	Alcoholics	-0.15 (N.S.)	-0.33 (N.S.)	-0.02 (N.S.)	-0.13 (N.S.)	-0.22 (N.S.)
TCC²	Controls	0.13 (N.S.)	-0.27 (N.S.)	-0.57 (p<0.01)	-0.52 (p<0.05)	-0.35 (p<0.05)
	Alcoholics	-0.12 (N.S.)	-0.19 (N.S.)	-0.62 (p<0.001)	-0.48 (p<0.05)	-0.32 (p<0.05)

¹SSI = Stop Signal Index (percentage of categorization response to stop trials).

²TCC = Temporal Context Confusion Index (FP2/Hits2) - (FP1/Hits1).

doi:10.1371/journal.pone.0023190.t003



http://www.orl-nko.be/common/b-ent_guidelines.htm

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