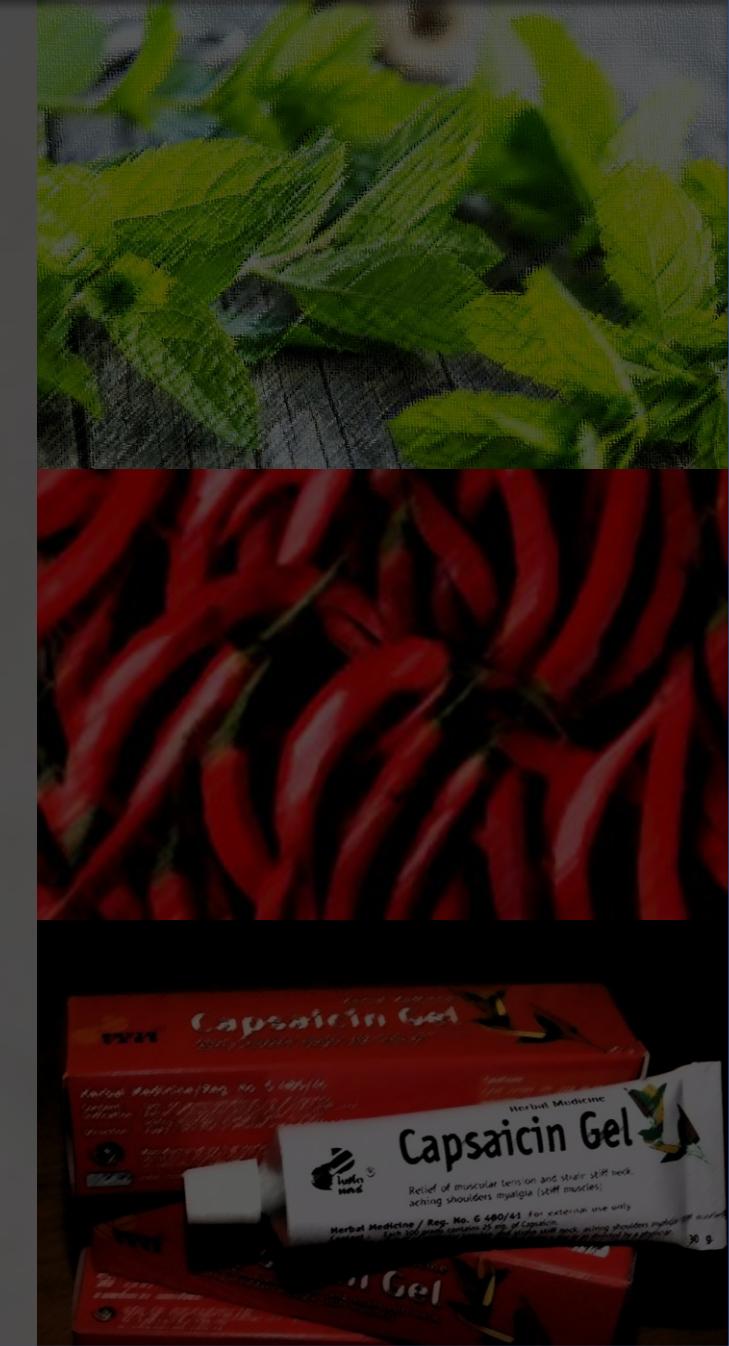


PUNGENCY

The Biology of spiciness: The two types of pungency

WED 12/02

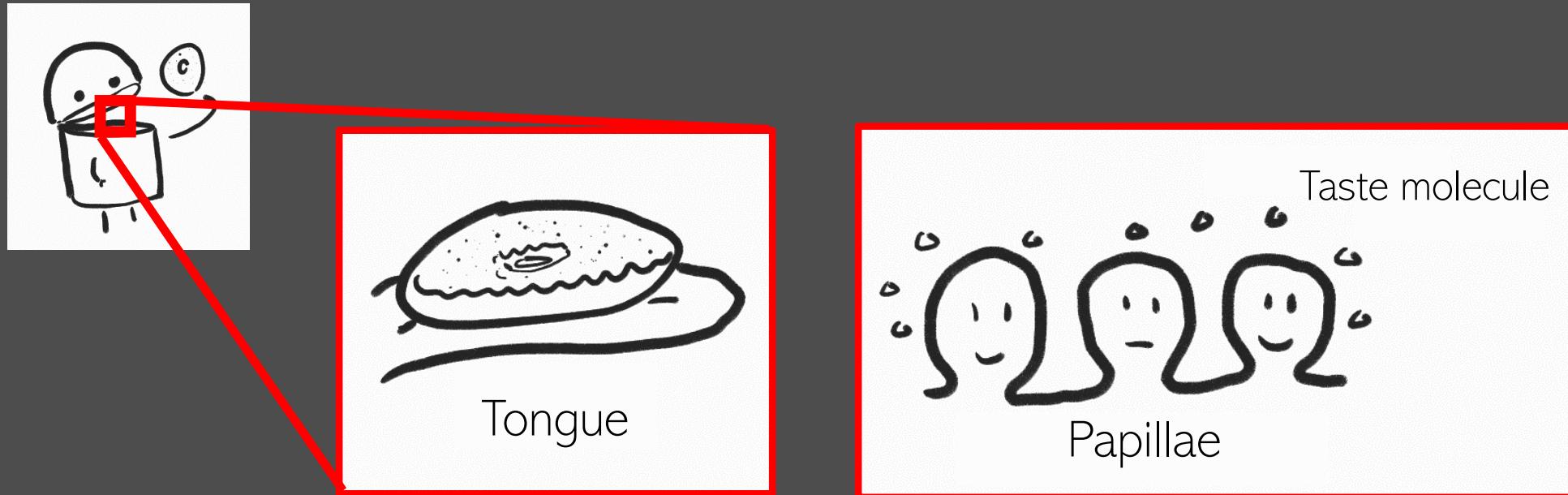
ADIL HASSAN KHAN, 서경덕



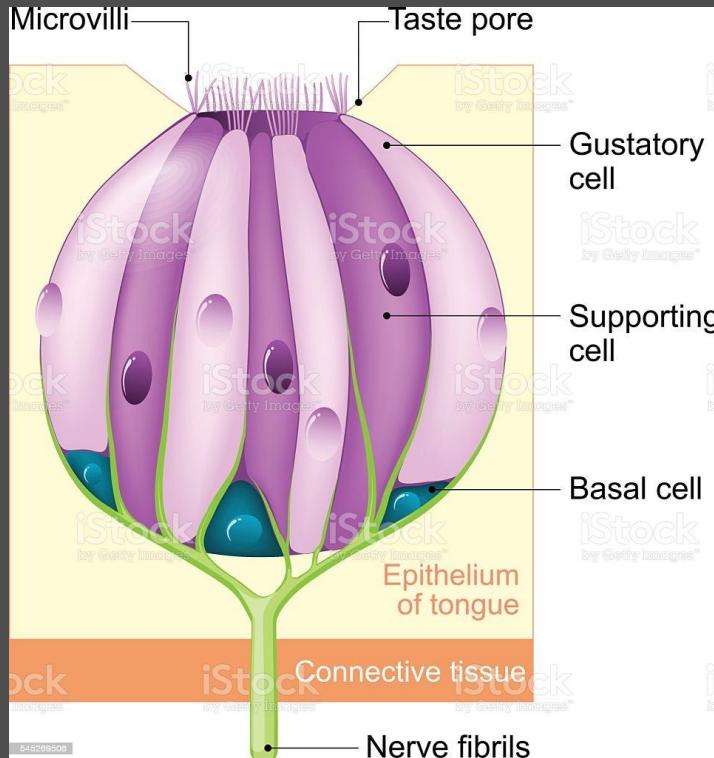
CONTENTS

- I. How do we taste
- II. The receptor of pungency
- III. Cold pungency?
- IV. Short evolutionary story

I. How do we taste



I. How do we taste



<Taste bud>

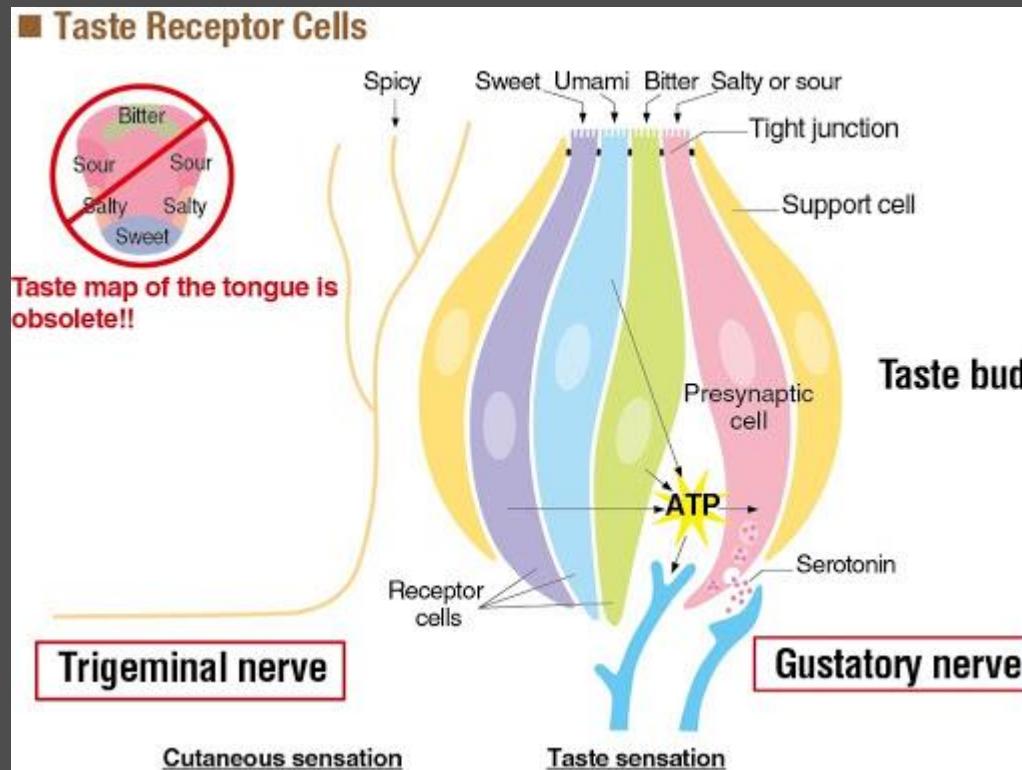
Papillae

- Grainy structure on tongue surface

Taste buds

- Contain taste receptor cell

I. How do we taste



Taste receptor(GPCR) detects...

Sweet, umami, bitter, salty or sour

But,
What about pungency?

Pungency

\neq

Flavor

Pungency

=

A kind of pain

II. The receptor of pungency

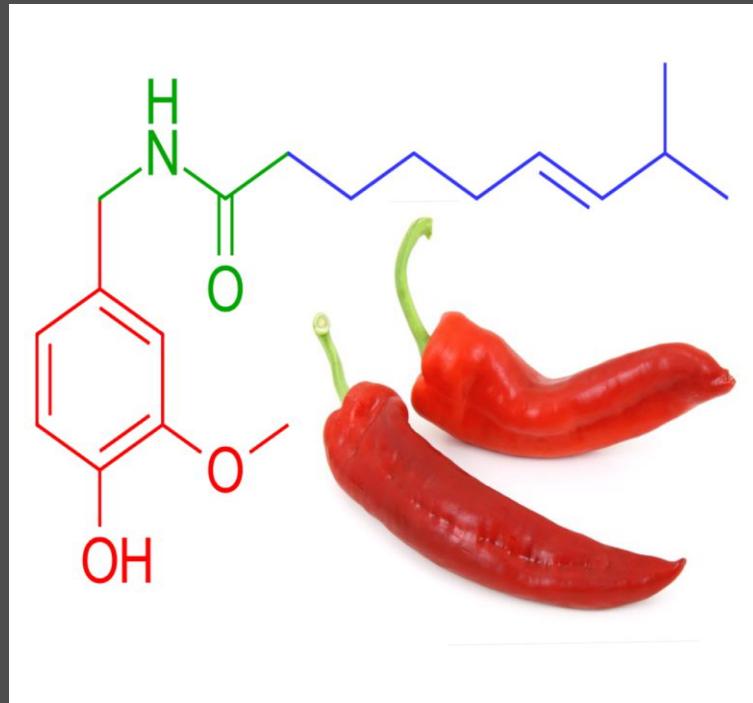


Polymodal Nociceptors

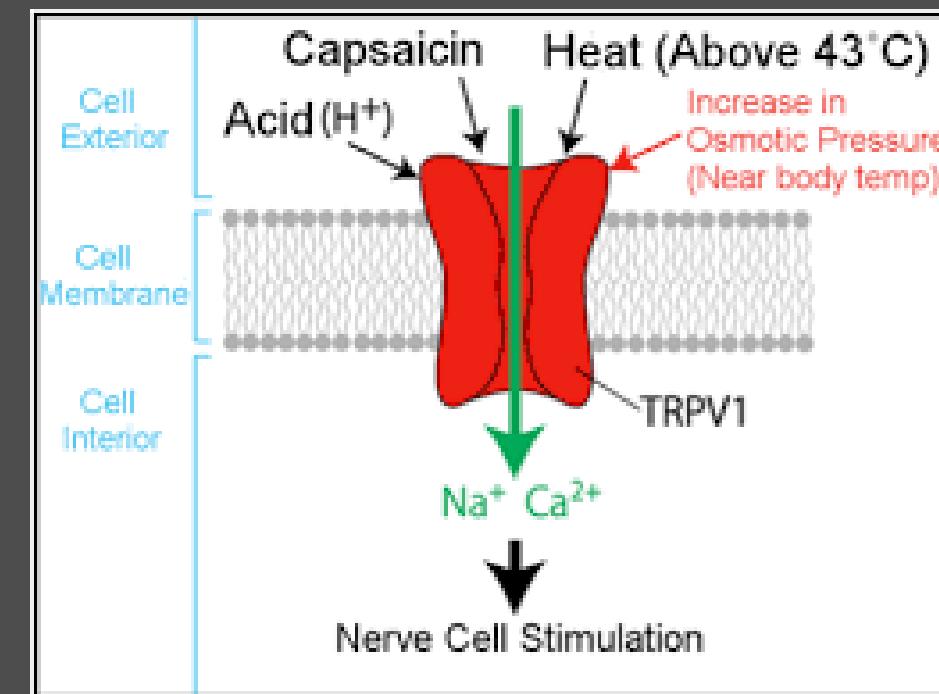


II. The receptor of pungency

Capsaicin receptor : TRPV1



Capsaicin



Painful, Sharp feeling

II. The receptor of pungency

Which receptor is activated depends on the food you eat

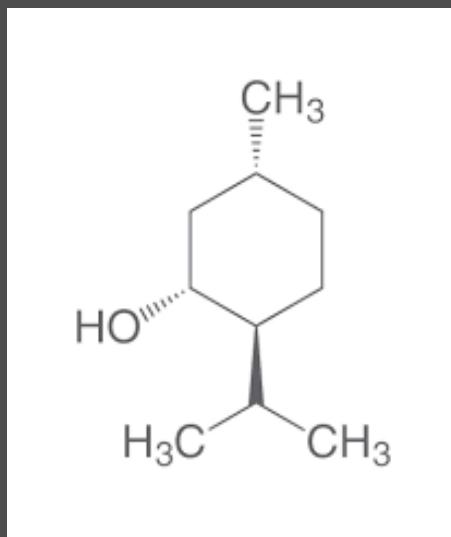


Chili Powder

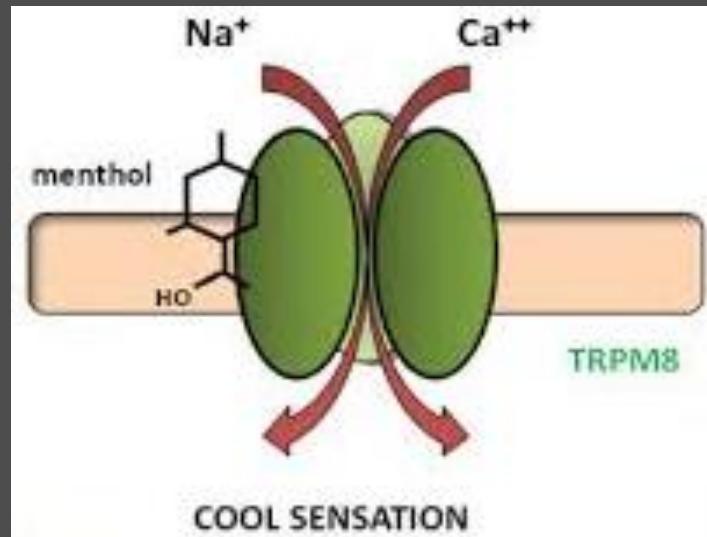


Wasabi

III. Cold pungency?



Menthol



TRPM8

Menthol receptor → TRPM8

TRPM8 detects 22-26 °C

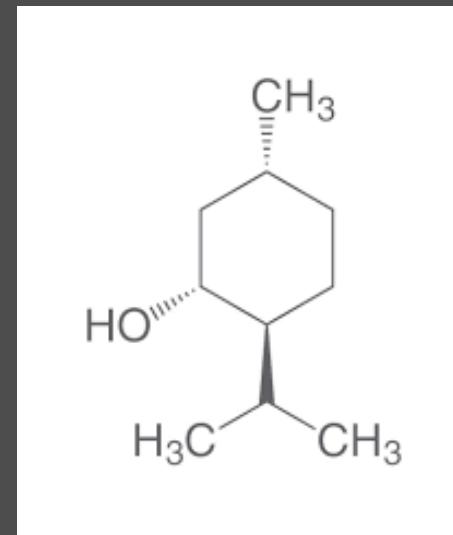
< 36.5 °C , cold feeling

No pain, cool minty

III. Cold pungency?



Mint

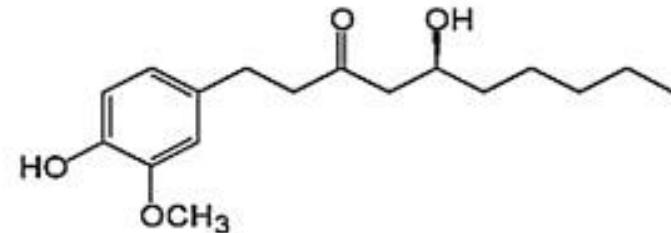


Menthol

III. Cold pungency?



Ginger (*Zingiber officinale*) rhizome



6-Gingerol (Pungent compound in fresh ginger)

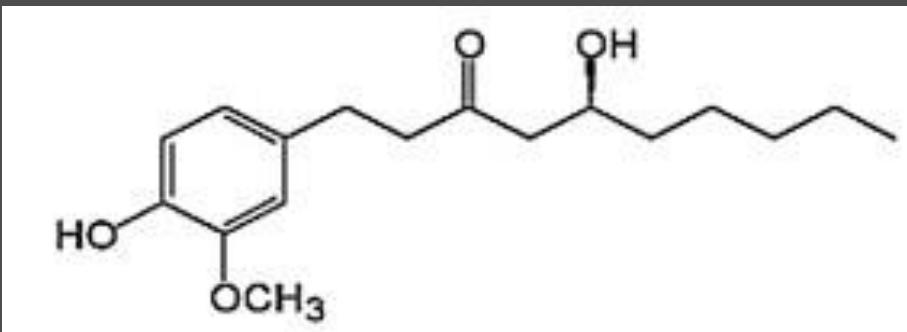
Another type of cold pungency : Gingerol

TRPV1 (VR1) receptor

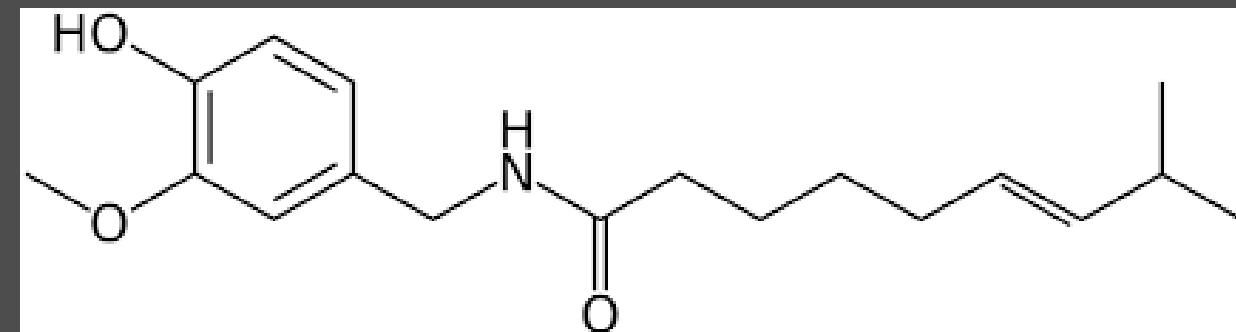
III. Cold pungency?

Why does this difference occur?

even tough same receptor detects them

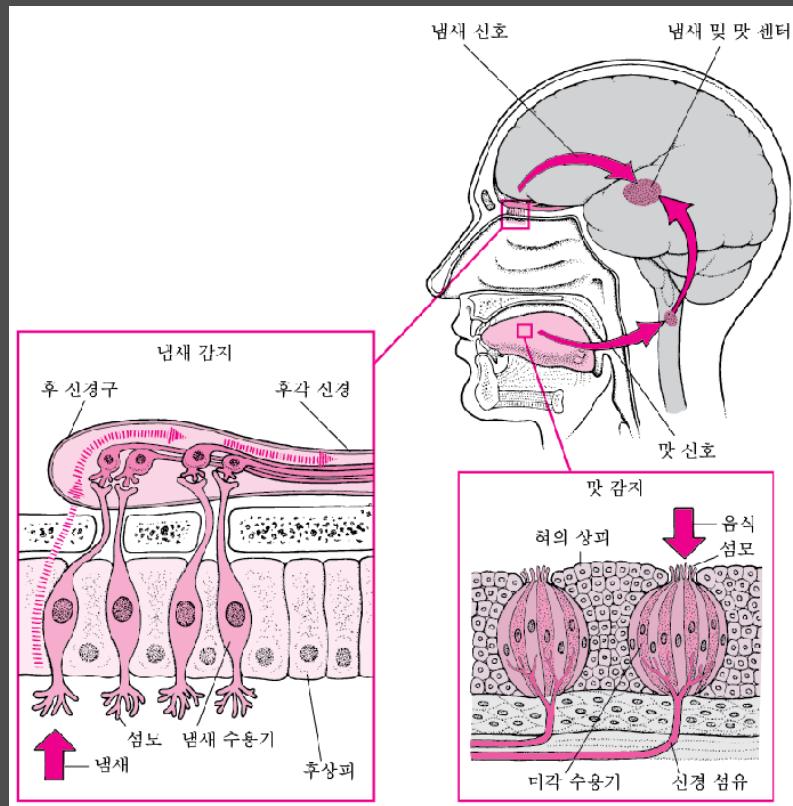


Gingerol



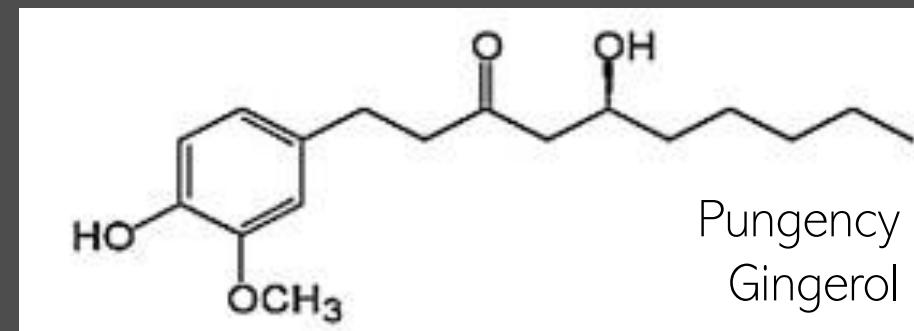
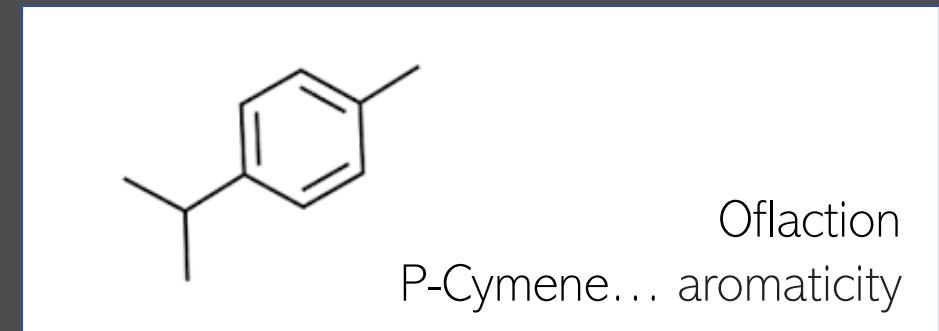
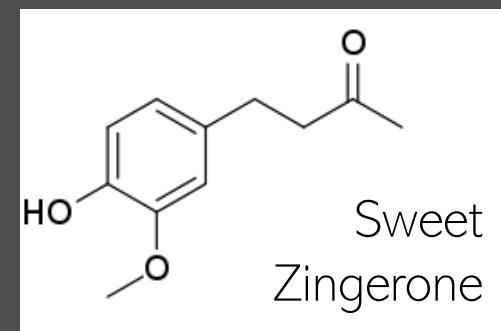
Capsaicin

III. Cold pungency?



Remembering flavor :

Taste(미각) + Olfaction(후각) + Sense of touch



III. Cold pungency?



ginger tea



pepper tea?

IV. Short evolutionary story



Mammal (Herbivorous animals)
(초식동물)



capsaicin

IV. Short evolutionary story



birds



capsaicin

Thank you!

References

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