

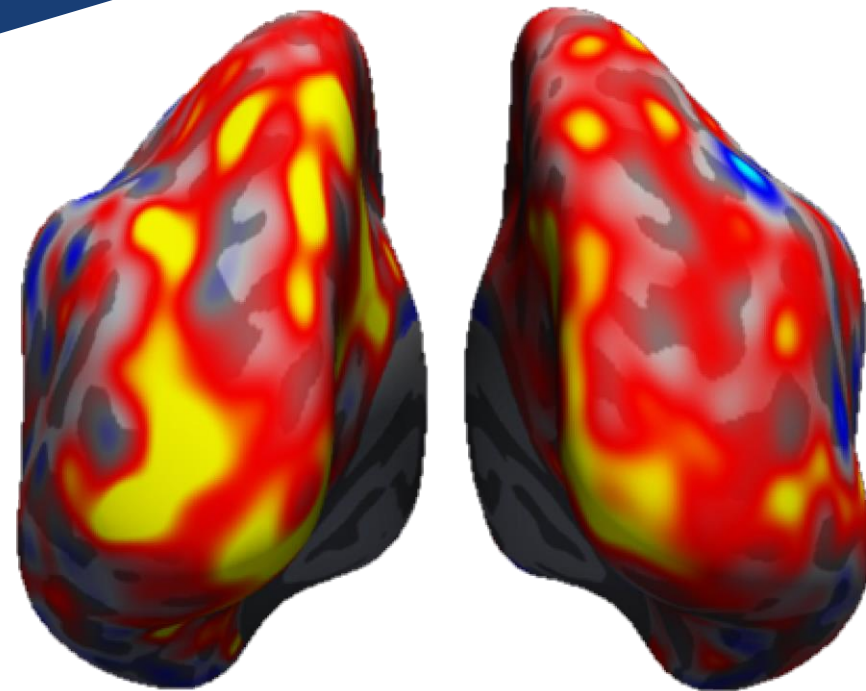
# Is There Evidence for... Neuroinflammation in Migraine?

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Messoud Ashina

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**Danish Headache  
Center**





# Disclosures

- Augustinus Foundation - Research travel funding
- TEVA – Speaker

## Migraine without aura

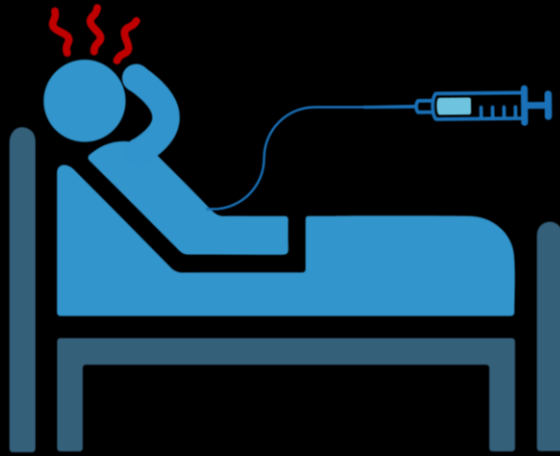


## Migraine with aura

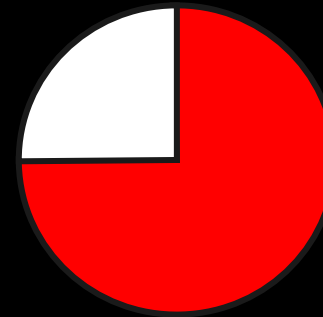




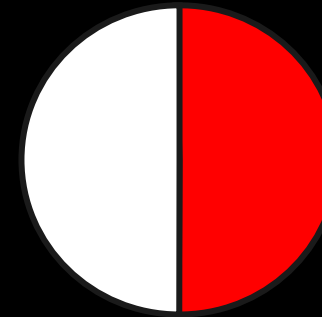
# Neuroinflammation in Clinical Models of Migraine



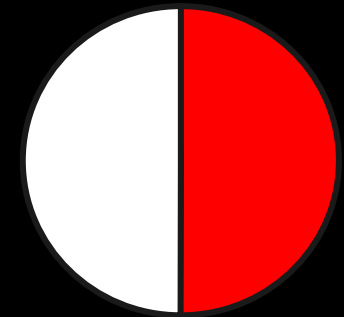
**Migraine  
induction**



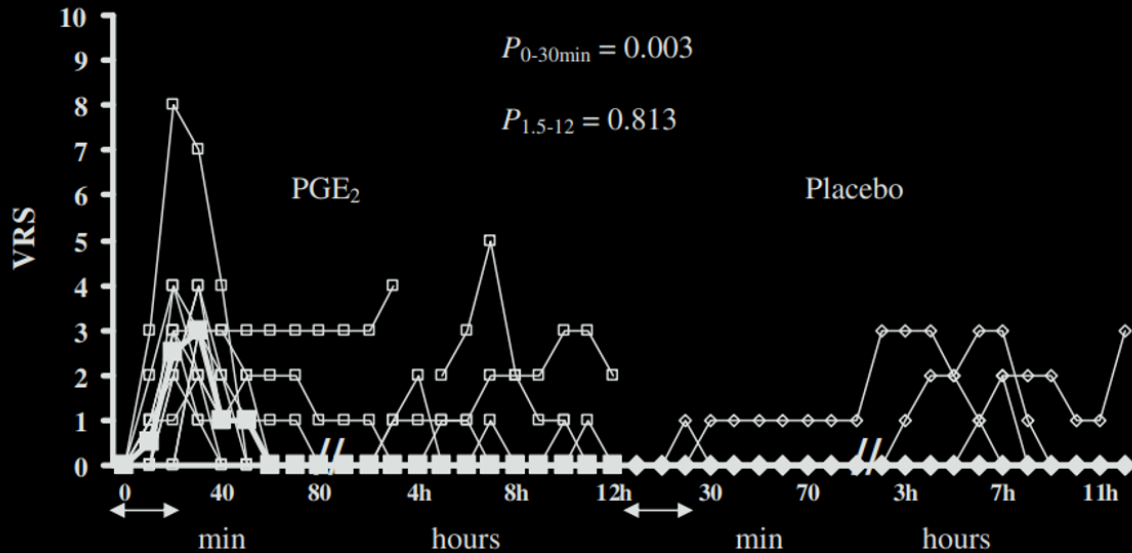
75%  
PGE2



50%  
PGI2



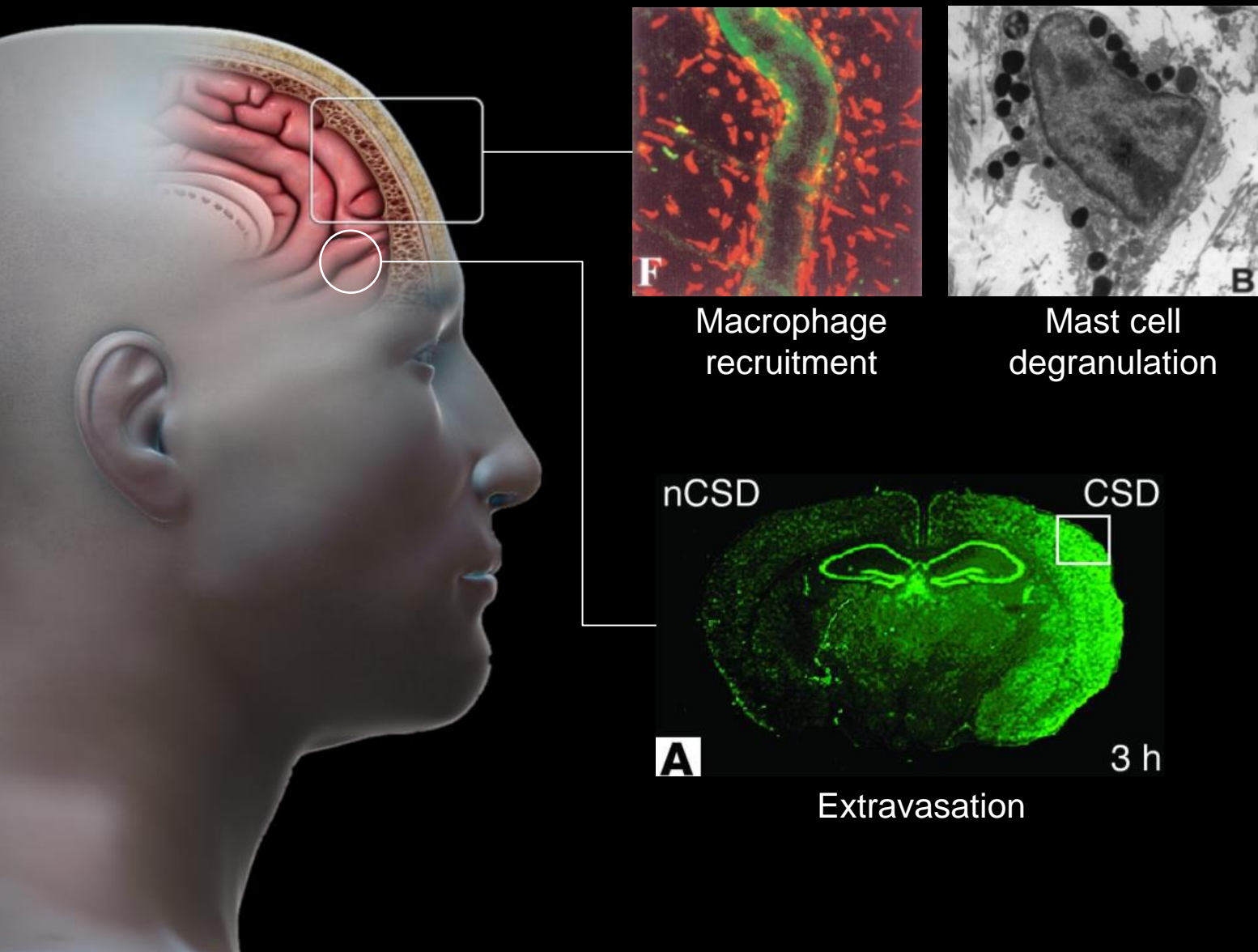
50%  
Histamine



Antonova et al., 2012, Cephalalgia  
Wienecke et al., 2010, Cephalalgia  
Lassen et al., 1995, Neuroreport  
Zhang et al., 2007, J Pharmacol Exp Ther



# Neuroinflammation in Preclinical Models of Migraine



Migraine triggers induce  
**neurogenic inflammation**

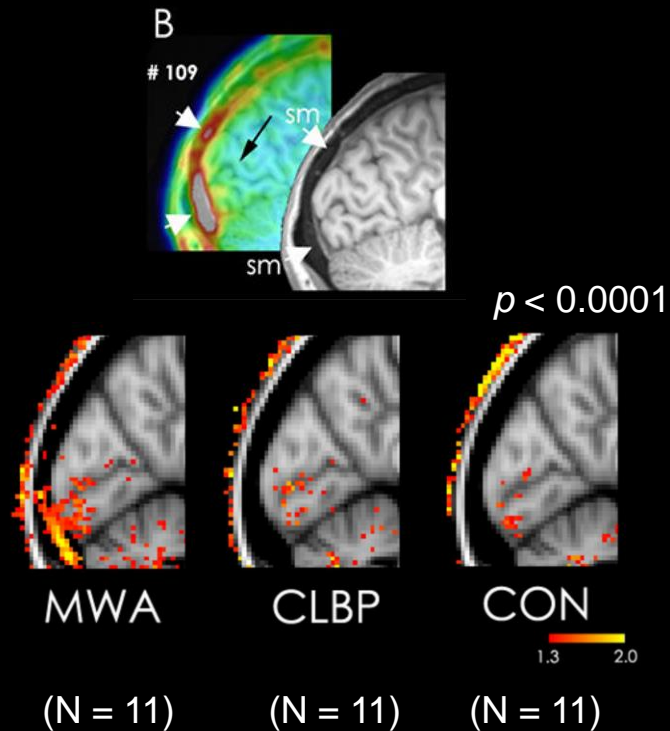
Inflammatory mediators  
**activate meningeal  
nociceptors**



# Imaging of Neuroinflammation

## PET

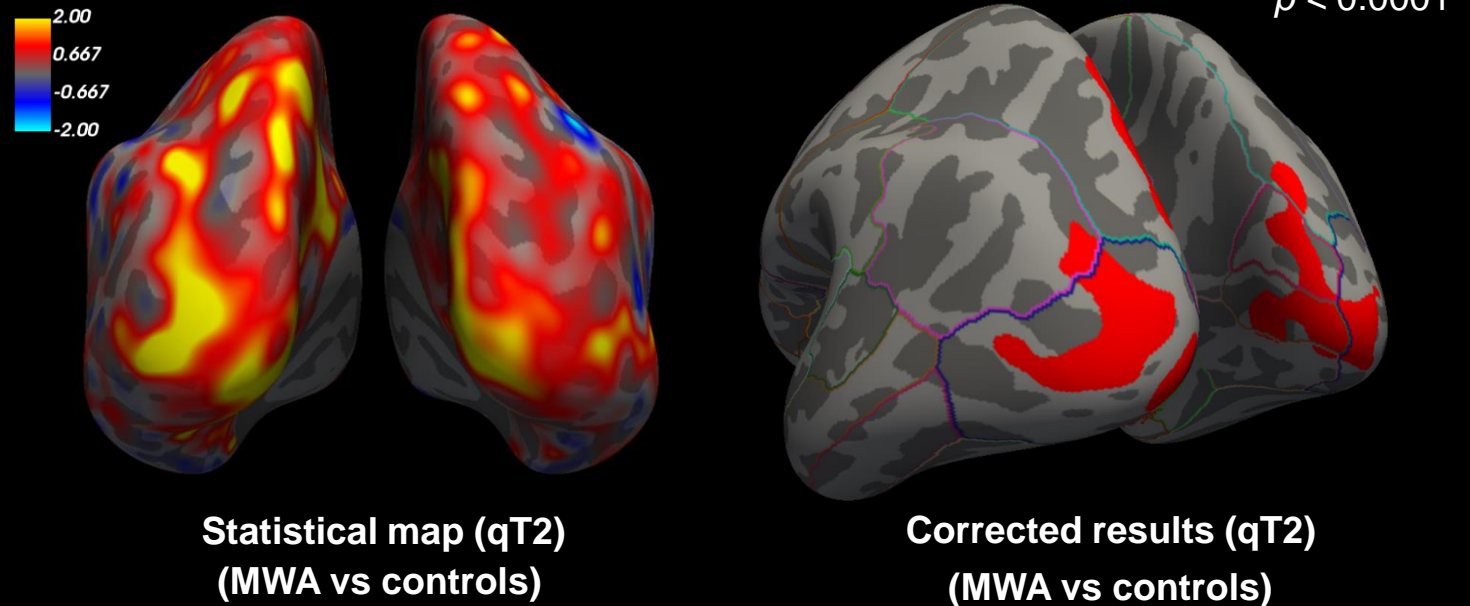
Uptake of the TSPO tracer (microglial marker)



## Quantitative MRI

Higher inflammatory MRI measures (qT2) in visual cortex.

→ Consistent with **edema** and **cell accumulation**



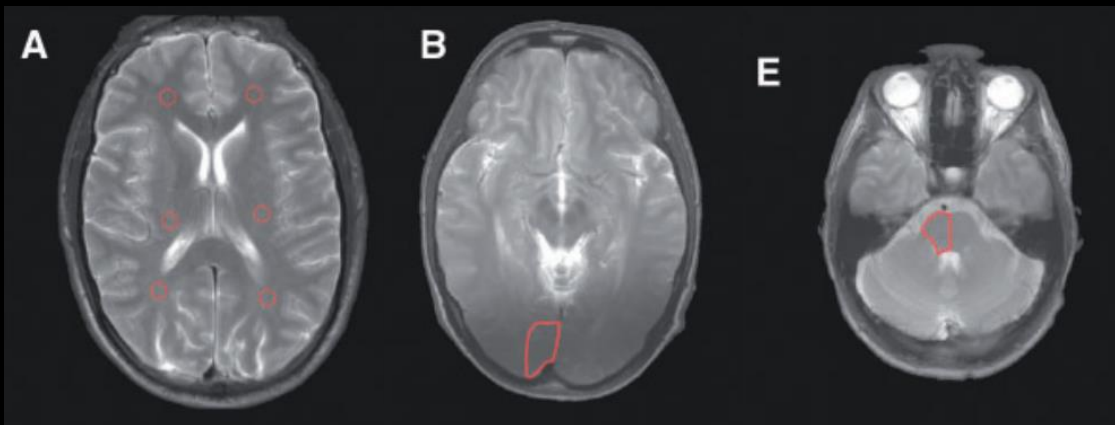
Migraine (N = 296) of which aura (N = 103)  
Healthy controls (N = 155)

**Suggesting Cortical and Parameningeal Neuroinflammation**



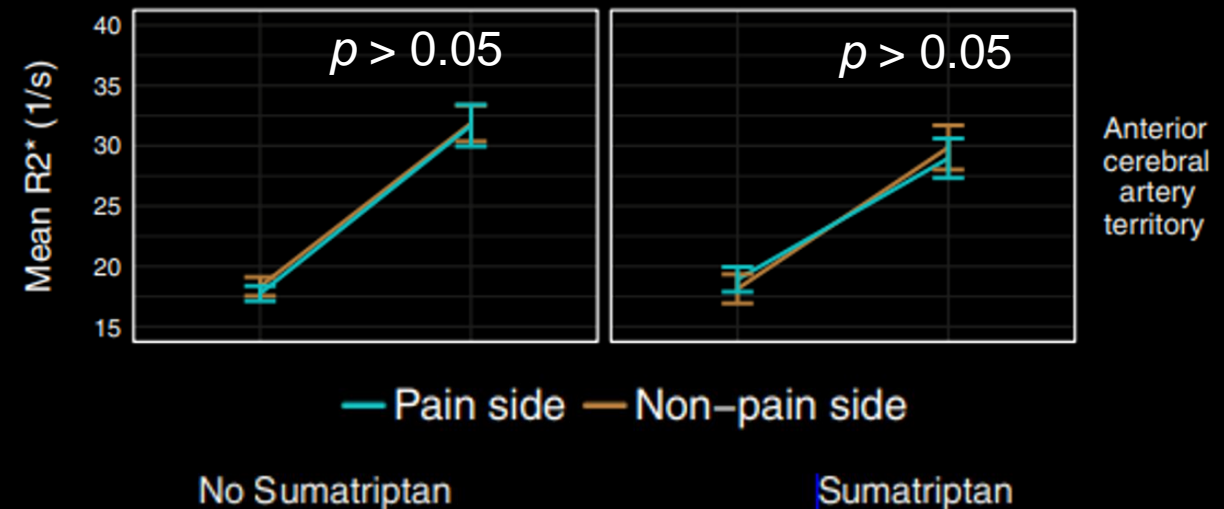
# Imaging of Neuroinflammation

## BBB permeability



No difference in permeability during migraine attacks without aura ( $p > 0.05$ ) or after aura ( $p > 0.05$ )

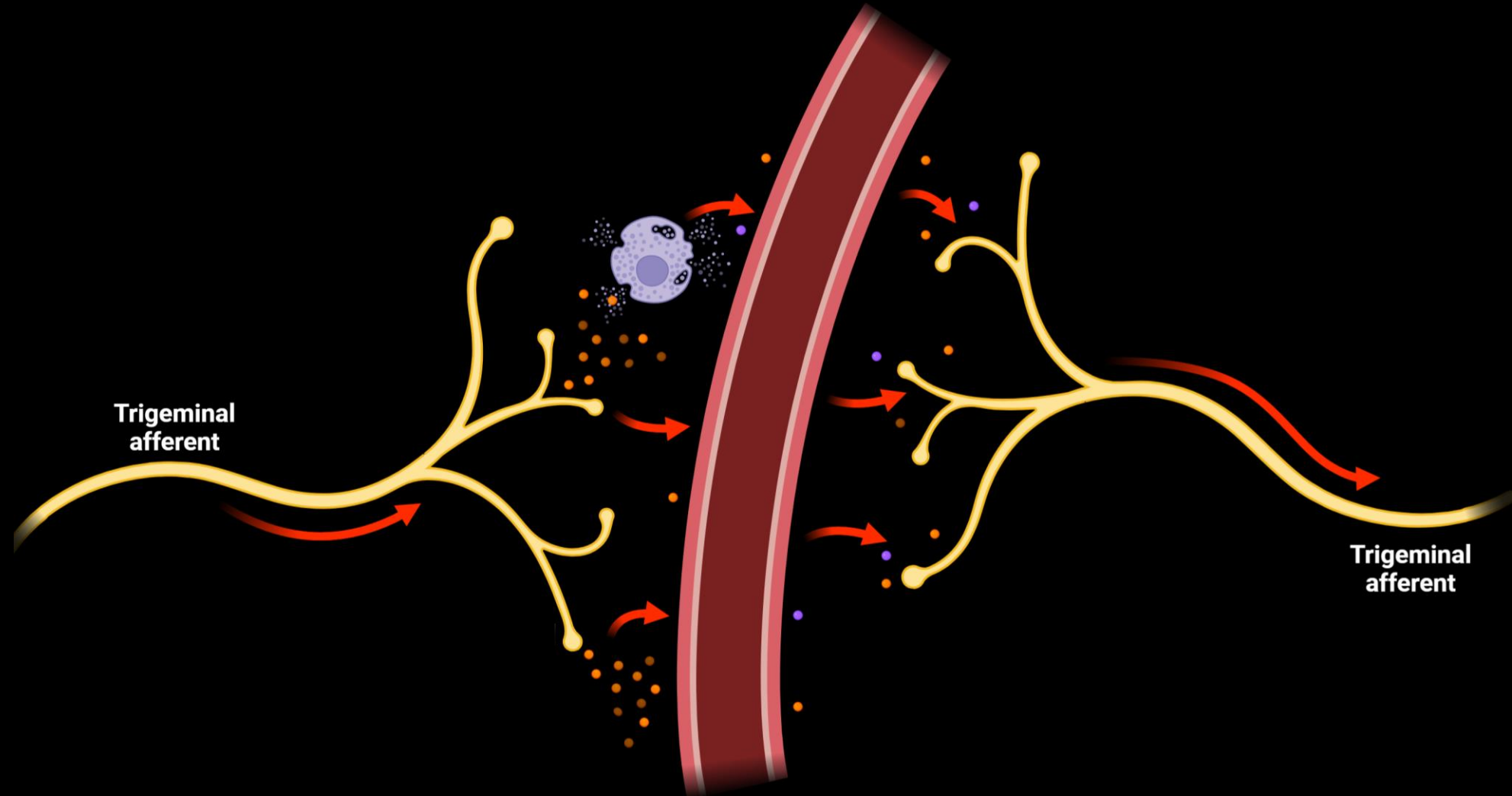
## Macrophage activity



## Meningeal inflammation?



# Is Neuroinflammation a Treatment Target?

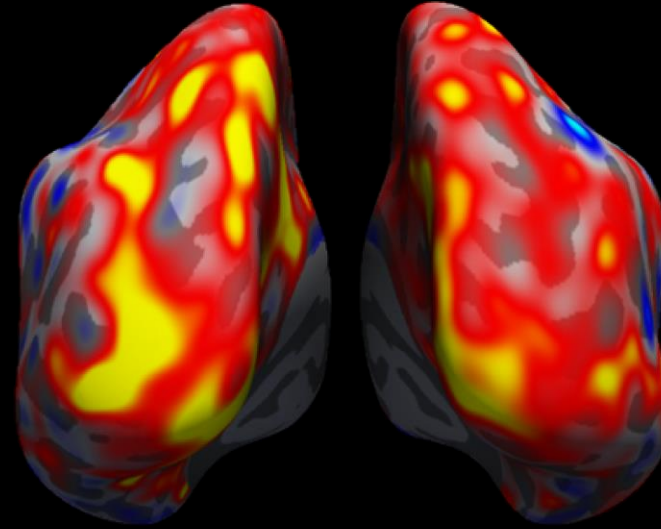


However, relative contribution of anti-inflammatory effect unknown...





## Main Messages



1. Neuroinflammatory substances elicit migraine
2. Neuroimaging suggests neuroinflammation in migraine with aura
3. Migraine treatments inhibit neurogenic inflammation

**Thank you for listening**