

The search for a human homologue of the macaque ventral intraparietal area

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Introduction

- The macaque ventral intraparietal area (VIP) is characterised by responses to tactile stimuli on the face and visual and auditory stimuli in the peripersonal space surrounding the head.

- These characteristics have fuelled attempts to draw parallels from macaque to human and to test whether the respective region plays a role in human body processing and, potentially, higher cognitive function.

Methods

- We conducted a comprehensive literature review to find all studies that define a putative human VIP (pVIP) location.

- We identified 3 common methods that have been used to localize pVIP based on different functional characteristics^{1,2,3}

- We compared the location of the pVIP coordinates to the proposed locations of regions neighbouring VIP (pLIP, pMIP & pAIP) and to cytoarchitectonic regions⁴

Results

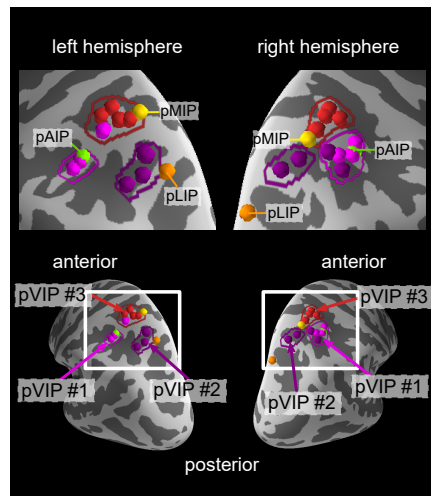
3 methods used to functionally localize pVIP:

pVIP #1: conjunction of higher responses to visual, tactile and auditory motion, compared to static control stimuli.¹

pVIP #2: higher responses to egomotion-consistent visual motion compared to random visual motion.²

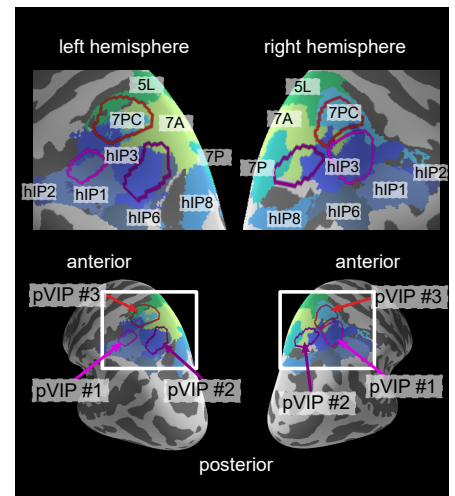
pVIP #3: topographic mapping of tactile stimuli on the face and visual stimuli close to the face³

Location of pVIP coordinates



We found bilateral clustering of pVIP coordinates for each localization method

Comparison of clusters to cytoarchitectonic regions



- pVIP #1 and pVIP #2 overlap with hIP3
- pVIP #3 overlaps with 7PC

Conclusions

- Attempts to define the location of pVIP have led to diverging, rather than converging, results.
- Future studies will need to take a multimodal approach, encompassing cyto- and myeloarchitectonic characteristics, anatomical connections, topology with respect to neighbouring regions, functional properties and topographic mapping, in order to better establish the location of a human homologue of macaque VIP.

References

- ¹Bremmer et al., (2001) Neuron
²Wall & Smith (2008) Current Biology
³Sereno & Huang (2006) Nature Neuroscience
⁴Amunts et al., (2020) Science

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