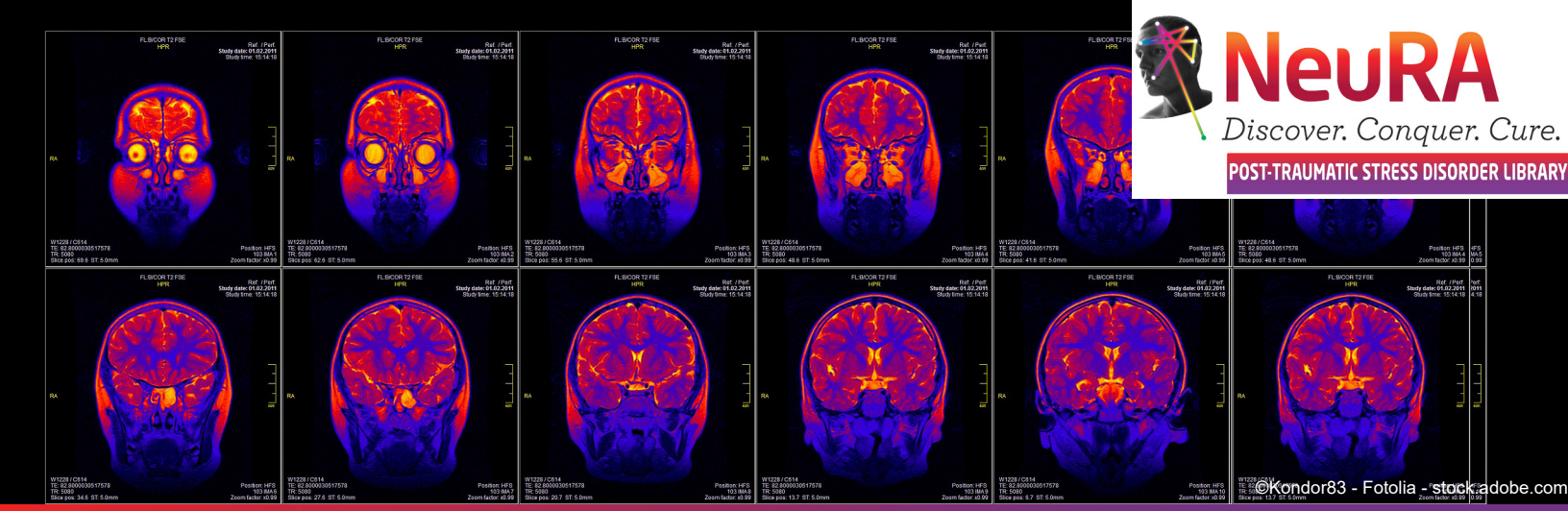

POST-TRAUMATIC STRESS DISORDER Factsheet

August 2021

What is fMRI and PET?

Functional magnetic resonance imaging (fMRI) measures blood flow to determine activation and deactivation of the specific brain regions. Positron emission tomography (PET) is a nuclear based imaging technique that utilises a radioactive tracer to visualise functional brain activity. The radioisotope tracers are coupled with a biological molecule such as glucose, which is used during cellular metabolism and can be used to highlight areas with changes in metabolic activity. Single-photon emission computed tomography (SPECT) offers more limited spatial and temporal resolution than PET but is less expensive as it does not require a cyclotron in close proximity.

What is the evidence for changes in neural activity in people with PTSD?

Compared to non-trauma-exposed controls, moderate to high quality evidence found clusters of increased activation in PTSD during resting state or task processing in bilateral anterior insula, left amygdala, left putamen, left precuneus, right hippocampus, right middle frontal gyrus fusiform gyrus, and right postcentral gyrus. Clusters of decreased activation were found in bilateral precentral gyrus, left angular gyrus, left supramarginal gyrus, left middle frontal gyrus, right posterior cingulate cortex, right medial prefrontal cortex, and right caudate nucleus.

Compared to trauma-exposed controls, people with PTSD showed clusters of increased activation in the left fusiform gyrus, right precuneus, right thalamus, dorsal anterior cingulate cortex, and lateral medial temporal lobe. Clusters of decreased activation were found in the left thalamus, left parahippocampal gyrus, right medial prefrontal cortex, right orbitofrontal cortex, right precentral gyrus, left frontal pole, bilateral inferior frontal gyrus, bilateral middle frontal gyrus, and dorsal anterior cingulate cortex.

During trauma-related autobiographical memory tasks, moderate quality evidence found increased clusters of activation in PTSD compared to trauma-exposed controls in the left posterior cingulate extending into the precuneus and the mid-cingulate cortex, right parahippocampal gyrus, and the right dorsal anterior cingulate cortex. There were clusters of decreased activation in PTSD in the right ventromedial prefrontal cortex extending into the orbitofrontal and the perigenual anterior cingulate, and the left midline nucleus of the thalamus extending into the medial and the lateral dorsal nuclei and the left angular gyrus.

Compared to people with major depressive disorder, there was more activation in the PTSD group during negative affect processing in the left inferior frontal gyrus (including ventrolateral prefrontal cortex), bilateral amygdala and hippocampus, left superior frontal gyrus, dorsolateral prefrontal gyrus, and right middle frontal gyrus.

Compared to people with borderline personality disorder, moderate to low quality evidence found more activation in the PTSD group during negative affect processing in the left inferior frontal gyrus, left middle temporal gyrus, right striatum, bilateral middle frontal gyrus (including parts of the left superior frontal gyrus, dorsolateral), ventral premotor cortex, and the right posterior parietal cortex.

For more information see the technical table

NeuRA
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NeuRA (Neuroscience Research Australia) is one of the largest independent medical and clinical research institutes in Australia and an international leader in neurological research.

Diseases of the brain and nervous system pose the greatest health, economic and social burden of any disease group because they are chronic, debilitating and have no known cures.

Medical research is the cornerstone of efforts to advance the health and wellbeing of families and the community. Our dedicated scientists are focussed on transforming their research into significant and practical benefits for all patients.

While we hope you find this information useful, it is always important to discuss any questions about PTSD and its treatment with your doctor or other health care provider.

HOW YOUR SUPPORT HELPS

We are able to make significant advances due to the generosity of countless people. Your donation allows us to continue to work towards transforming lives. For information on how you can support our research, phone **1300 888 019** or make a secure donation at **neura.edu.au/donate**

NeuRA (Neuroscience Research Australia) Foundation
T 1300 888 019 **F** +61 2 9399 1082
ABN 57 008 429 961

Margarete Ainsworth Building
Barker Street, Randwick NSW 2031
PO Box 1165 Randwick Sydney NSW 2031 Australia

neura.edu.au