

## Introduction

- Depression is among the top 10 most disabling conditions in the world<sub>1</sub>
- Misdiagnosis rates up to 75% have been reported under current diagnostic methods<sub>3</sub>
- Research studies have proven that MRI shows physical changes in the brain from depression and other disorders<sub>2</sub>
- Using MRI as a diagnostic tool in the clinical setting would increase ease and accuracy of major depressive disorder (MDD) diagnosis while helping improve plans of treatment
- Imaging for depression would help reduce the associated negative stigma
- It is the fear of the stigma that often keeps patients from being seen and treated

## Types of MRI

- **Structural** MRI shows the brain's size and shape<sub>2</sub>
- **RS-fMRI** shows areas of brain function while at rest<sub>6</sub>
- **TB-fMRI** images areas of connectivity in the brain while completing a task<sub>5</sub>

# USING MRI TO DIAGNOSE DEPRESSION

## Research findings

12

Scientific studies using MRI allowed scientists to conclude that the Default Mode Network, a network of interacting brain regions, is responsible for the ruminative thought process<sub>2</sub>. Images showed hypogyrification and decreased blood flow in the DMN in patients with depression<sub>2</sub>.

A different study investigated brain pathophysiology in panic disorder and depression. fMRI analysis concluded that the main area of pathophysiology in depression is the anterior cingulate gyrus. The main area in panic disorder was found to be the precuneus.

The study concluded that the ACC was a biomarker for depression, making it valuable for diagnosis<sub>1</sub>.

## Conclusion

- Finding depression biomarkers with MRI would aid clinical interviews regarding the diagnosis and disease progression.
- Images of brain structure and function give information that patient history simply cannot.
- Looking at depression as a physical deficit rather than an intellectual one will start to lessen the negative stigma felt by these patients.

## References

1. Lai, C. (2018). The regional homogeneity of cingulate-precuneus regions: The putative biomarker for depression and anxiety. *Journal of Affective disorders*, 229,171-176.
2. Nixon, N., Liddle, P., Nixon, E., Worwood, G., Liotti, M., & Palaniyappan, L. (2014). Biological vulnerability to depression: Linked to structural and functional brain network findings. *British Journal of Psychiatry*, 204(4), 283-289.
3. Redlich, R., Almedia, J., Grotergerd, D., Opel, N., Kugel, H., Heindel, W.,...Dannlowski, U. (2014). Brain morphometric biomarkers distinguishing unipolar and bipolar depression. A voxel-based morphometry-pattern classification approach. *JAMA Psychiatry*, 71(11), 1222-1230.
4. Sankar, A., Zhang, T., Gaonkar, B., Erus, G., Costafreda, S.G., ...Fu, C. (2016). Diagnostic potential of structural neuroimaging for depression from a multi-ethnic community sample. *British Journal of Psychiatry Open*, 2, 247-254.
5. Tozzi, L., Doolin, K., Farrel, C., Joseph, S., O'Keane, V., Frodl, T., & O'Keane, V. (2017). Functional magnetic resonance imaging correlates of emotion recognition and voluntary attentional regulation in depression: A generalized psycho-physiological interaction study. *Journal Of Affective Disorders*, 208535-544. doi:10.1016/j.jad.2016.10.029
6. Zang, Y., Zuo, X., Millham, M., & Hallett, M. (2015). Toward a Meta-Analytic Synthesis of the Resting-State fMRI Literature for Clinical Populations. *Biomed Research International*, 20151-3. doi:10.1155/2015/435265

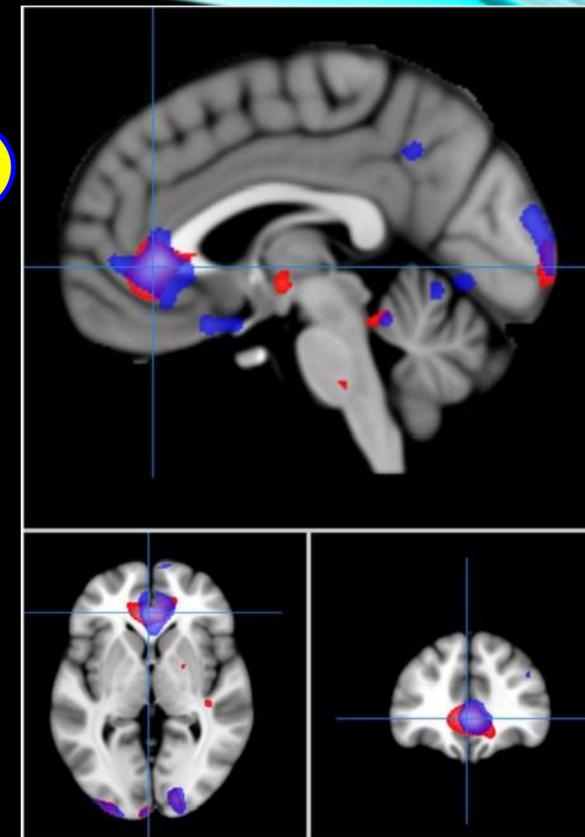


Image 2 depicts reduced activation in the ACC in the MDD experimental group<sub>1</sub>.

Structural

Functional (fMRI)

Diffusion MRI

