

# Visualizing the Developing Brain using MRI

## Objectives

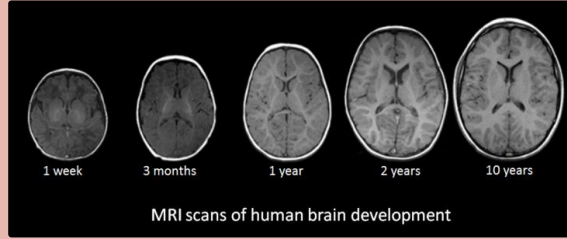
- Define MRI and its use in brain imaging
- Explore how the developing brain differs in appearance to the mature brain

## What is MRI?

- Magnetic resonance imaging is an imaging test that can help diagnose various conditions. It uses large magnets, radio waves, and a computer to produce detailed images. No ionizing radiation is used in these exams. An MRI can be performed with or without contrast agent.

## Why is MRI used for imaging the brain?

- MRI is the most sensitive imaging test of the head, particularly the brain, as compared to other modalities, such as X-rays.
- A brain MRI will show structures including: the brain, blood vessels, skull and facial bones, surrounding soft tissue and skull-based fractures.
- Traditional X-ray, while revered as the “first-line of imaging”, is not optimal for imaging of the brain due to the inability to create an axial view of the skull. This means that the skull itself would be the subject of the image instead of the brain. Additionally, since the brain is developing rapidly during adolescence, it is far more radiosensitive and excess ionizing radiation should be avoided.



## How does the developing brain differ from a mature brain?

### Developing Brain

- In the first six months of life the gray and white matter intensities appear flipped to those of mature adult brains (gray matter appears lighter in color than white matter.)
- Under MRI, developing brains seem to have an increase in white matter and a U-shaped growth of gray matter, all peeking at different times in development

### Mature Brain

- MRI shows that a mature brain has a decrease in gray matter, but it becomes denser.

## Conclusion

- Magnetic resonance imaging is a non-ionizing form of imaging that uses magnets and radio waves to aid in the diagnosis of a variety of conditions.
- MRI is the preferred modality for the brain because it can demonstrate the soft tissue of the brain without being inhibited by the skull. MRI helps distinguish important differences between the gray and white matter of the brain.

