What is a meningioma?
Meningiomas are a category of generally non-malignant tumours arising from the meninges of the brain. Meninges are the thin layers of protective tissue surrounding the brain and spinal cord. The meninges divide into 3 layers: the pia mater, the arachnoid mater, and the dura mater. The dura mater is the outermost layer. Meningiomas arise from the middle layer: the arachnoid mater. These tumours are therefore found outside of the brain (but inside the skull).

What are the signs and symptoms of meningiomas?
Most patients with meningiomas are asymptomatic and usually come to clinical attention incidentally. When symptoms are present they are dependent on tumour location and size and may include headaches, behavioural changes, cognitive problems, visual disturbances, headaches, morning nausea, and vomiting. In some patients, seizures can develop as well.

Who gets meningiomas?
Meningiomas are the most common primary brain tumour in North America and often arise in mid to late adulthood. Risk increases with age and peaks at 60 to 70 years of age. Rare cases may arise in childhood. The overall prevalence is higher among women compared to men in all types of meningioma with a ratio of 2.5:1.

Although the vast majority (95%) of cases are sporadic, in 5% of cases, meningiomas arise in patients with an inherited genetic condition called neurofibromatosis type 2 which can also be seen in pediatric cases. The only known environmental risk factor that increases the likelihood of developing a meningioma is exposure to cranial ionizing radiation (cell phones do not emit ionizing radiation).

Are there different types of meningiomas?
Meningiomas are classified by the WHO grading system from Grade I-III based on their appearance under the microscope. Grade I meningiomas are low-grade and do not possess any malignant characteristics. Grade II meningiomas are called atypical and do possess only some malignant features. Grade III meningiomas are called anaplastic, these are frankly malignant, are considered a cancer, and require radiation and chemotherapy for treatment. In North America, 94% of meningiomas diagnosed are WHO grade I.
It is important to note that within each grade category different subtypes of meningioma exist according to their unique appearances under the microscope. However, it is their grade and not their unique subtype that typically dictates the recommended treatment and clinical management.

The most common grade I meningioma subtypes are meningothelial, fibroblastic, and transitional. Amongst grade II meningiomas, clear cell and chordoid are most prevalent. The most frequent grade III meningiomas are papillary and rhabdoid.

What is the treatment for meningiomas?
Meningiomas are typically diagnosed and followed by a neurosurgeon through MRI or CT scan. Unlike other brain tumours, meningiomas have a fairly characteristic appearance on MRI and therefore usually do not require a biopsy for confirmation of the diagnosis.

The typical treatment for meningioma is surgical resection. In cases where the tumour cannot be fully removed, radiation therapy such as stereotactic radiosurgery (a form of precision radiation) may be used in addition to surgical procedures. In cases of grade III meningioma, chemotherapy may also be used as an adjunct to treatment.

Do all meningiomas require surgery?
No. Although surgery is the treatment of choice for these tumours in patients who are symptomatic, surgery may not be necessary or recommended for certain patients.

As an example, no treatment or radiation therapy may be best for patients with:
- Small, slowly growing tumours with minimal or no symptoms
- Surgically inaccessible tumours

What is the prognosis for meningiomas?
After surgery recurrence rates vary between 10-32% in the next decade of life. Factors associated with an increased likelihood of recurrence include:
- Larger tumour size and attachment to neighbouring normal structures
- Higher WHO tumour grade
- Less than complete tumour removal

In patients who are symptomatic prior to surgery, symptoms may resolve immediately after surgery or after a series of weeks. In some patients however, symptoms may only improve but not fully disappear. A discussion should be had with your treating neurosurgeon to discuss the likely risks and benefits of surgery for your unique case.