

Evaluation of a Raman Spectroscopy Probe in the Diagnosis of Brain Tumors

ID # 1083, Category: BM, Senior Division)

Research Question:

- Can a probe utilizing Raman Spectroscopy be used intraoperatively to accurately differentiate and identify brain tumors?

Utilizes Raman Spectroscopy (RS):

- Observing the “shift” that molecules undergo when hit by a laser
- Every molecule has a unique Raman “shift”, this shift can be measured to directly identify the type of molecule in question (H2O, gluten, brain tumors, etc)

Data Analysis & Results

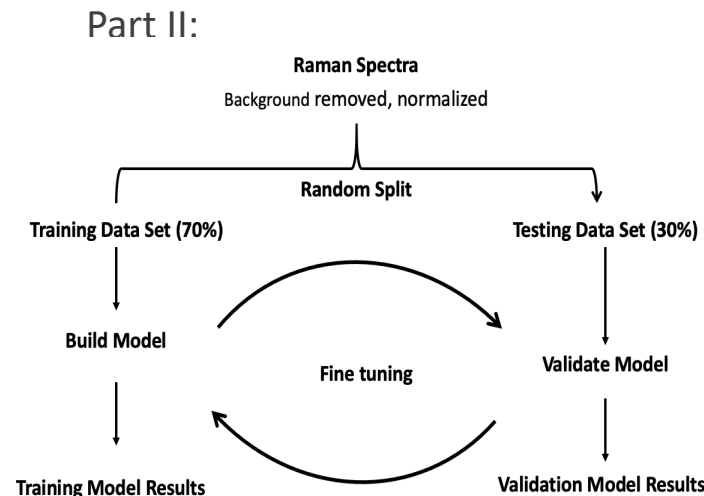
- Model is 94.1% accurate at using Raman spectra to identify what type of brain tissue any given sample is
- Found with 1066 spectra from 141 resected specimens

Accuracy	Kappa	Sensitivity	Specificity
94.1%	.92	100%	100%

This chart shows the final results of the model I developed

Methodology

- Part I:
 - 1) Surgeons resect samples of tissue during surgery
 - 2) I take spectra of those tissues in the OR
 - 3) Pathologist examines the frozen tissue samples & identifies them (as white, grey, GBM, infiltrating, or necrotic)
 - 4) I code the spectra with data entry and then deidentify the reports of patient info/pathology reports and send to build the model (which I do in part II)



Interpretation & Conclusion

- Even with the OR lights & Microscope lights on, the model was still able to use the spectra to be 94.1% (highly) accurate in its predictions
- Overall, these results are highly encouraging for future of Brain tumor resection
- Hopefully this can be applied to allow surgeons to use an intraoperative RS probe and save many more lives

