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Q: Can you tell me what a biomarker is?

A: A biomarker is a biological parameter or substance that is a measurable indicator of a human state, a certain disease state, or a person's response to a drug therapy or some other environmental challenge.

Q: How do you think biomarker development will help us in Addiction, Psychiatry and Neurology?

A: The brain is the most complex organ of the human being and a lot is not known about how it functions and how the abnormal functions come into play when you have many types of psychiatric disorders, substance abuse, schizophrenia, depression, and brain injury. We think the imaging and non-imaging biomarkers can be used like a window looking at how the brain is different under these types of conditions.

Q: Could biomarkers help us differentiate between Multiple Sclerosis and depression?

A: Today, no, but I think if the research stays, there are some promising leads with Multiple Sclerosis. Depression is more challenging because of the individual differences. I think there are changes in the neurochemistry environment and so what we measure with biomarkers is very much consistent with measuring these types of tangible changes so I think it is possible.

Q: Can a biomarker tell us if someone has a brain injury or trauma due to drug use?

A: Yes. We have already shown in our work in the Department of Psychiatry with Dr. Mark Gold and others, that substance abuse in someone who takes methamphetamines, for example, can cause minor brain damage similar to that seen in traumatic brain injury. We already know that in traumatic brain injury that there is a biomarker release in the cerebral spinal fluid and also in blood. So it is very likely that in substance abuse, particularly in the more severe cases, we will see the same thing.

Q: What about biomarkers and Alzheimer's disease?

A: Alzheimer's is a very interesting case study that is a huge problem in the state of Florida with the elderly population. People struggle with diagnosis and now there is really a big push to use the existing biomarker technology. One of those biomarker tests is a CSF based test to look at a protein called TAU and that is really being pushed toward FDA approval. Another one that has just received FDA approval is PET Imaging ligand. You can actually track some of the amyloid deposits in the more advanced stages of Alzheimer's disease. Those are huge steps and 10 years ago

everything was all research based and now all of a sudden it is being used in practice. So this has been really very exciting to see.

Q: Which scientific articles do you suggest physicians read to learn more about these markers?

A: I talk about some of the traumatic brain injury markers in a paper now in press by first Author, Linda Papa in the Journal of Trauma so look out for that paper. The other paper of interest has to do with CTE, or Chronic Traumatic Encephalopathy. CTE is sort of a tauopathy like Alzheimer's disease as a result of repeated concussions or mild injury and this major paper came out with lead author Lee Goldstein in the Journal of Science Translational Medicine where they talk about the human cases of CTE such as the retired NFL players as well as a very interesting animal model for studying CTE.