Applying Brain Tumor Data to Early Diagnosis and Treatment of Breast Cancer

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The National Cancer Institute (NCI) is a government agency focusing on the prevention, diagnosis, and treatment of cancer and its effects. The NCIâ€™s primary mission is to â€œtarget, prevent, and treat cancer by improving the prevention, diagnosis, and cure of cancer in Americansâ€. Much attention in research and development focuses on breast, prostate, and colon cancer, as well as the development of new drugs and diagnostics to help physicians find ways to treat cancer faster and earlier. More recently, the NIH was dedicated to cancer research, treatment, and prevention.

Currently, 70% of all lung cancers in the U.S. are due to either smoking or secondhand smoke. Another 22% of all cancer diagnoses in this country are related to asbestos exposure. Dr. Michael Kolover, a researcher in the NCIâ€™s laboratory of Genome Biology in San Francisco, led a recent study (titled â€œIntriguing Preliminary Evidence From a Recovered Brain Tumor to Detect Breast Cancerâ€) that has put forward a theory to help doctors at early stages of the disease. The study involved transplants of brain tissue. There were many brain tumors diagnosed in this particular study group of patients, some cancerous, some not. All of the test brain tissue samples were otherwise normal brain tissue and for some of these patients, experimental lesions or tumors were caused by the underlying cancer.

Each month, patients with brain tumors receive imaging devices like MRIs or positron emission tomography (PET) scans. Over the course of the past year, the researchers focused on identifying tissues from two regions of the brain to see if any features could be inferred about the specific form of cancer. Using magnetic resonance spectroscopy (MRS) and mass spectrometry (MS), they generated a set of 13 parameters that they wanted to examine and highlight. The research team included nine investigators, some of whom were medical scientists, who served in a planning stage and initiated collaboration during the research phase. Based on the results of each sampleâ€™s survey, researchers were able to identify terms that encapsulated every single region of the brain. These parameters were then compared with data obtained from other brain tissue samples for obvious connective tissue in the brain. The scientist also collaborated with geneticists and medical physicists, allowing them to combine information and create new data that would be accessible to medical staff.

More specifically, the scientists were able to identify terms from one patientâ€™s sample that described various characteristics associated with early breast cancer. They also narrowed down an 8â€ slit surrounding the patientâ€™s tumor to see if the pattern could be used to predict which patients might have breast cancer recurrence. The team found that there were multiple connections between the simulated lesions and the CT scans that could be interpreted to include the patientâ€™s breast cancers. In many cases, they were then able to use their results to develop an experimental PET/CT scan that could be used to detect breast cancer in the region of the body specifically assigned by the 12 specific terms. The results of these experiments are expected to be published in the journal Nature. However, there are also other ways for this research to be used. For example, the scientists could collaborate to develop software programs that are designed to look for specific words or color coding that could be used to select patients who might have returned to the same area of the brain for recurrence. They could then apply this research to the diagnosis and treatment of breast cancer patients.

These scientistsâ€™ work shows how this kind of research can be used in the diagnoses of specific cancers. For example, since the tumor is derived from an area of the brain, a colorized PET scan of the area could identify tumor cells and distinguish between different types of cancer cells. Since the tumors were generated in these regions of the brain, the research could also be applied to help doctors identify places where cancerous cells were likely to originate. This type of research could help both patients and doctors as they learn more about the determinants of early diagnosis of different cancers, which in turn could improve the outcome of the treatment and success of the treatment.

A Close Up Of A Person Holding A Baseball Bat