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Prostate cancer spurs new nerves

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Prostate cancer – and perhaps other cancers – promotes the growth of new nerves and the branching axons that carry their messages, a finding associated with more aggressive tumors, said researchers from Baylor College of Medicine in the first report of the phenomenon that appears today in the journal *Clinical Cancer Research*.

Previous research showed that prostate cancer follows the growth of nerves, but this is the first time that scientists have demonstrated that the tumors actually promote nerve growth.

"This is the first report of this phenomenon," said Dr. Gustavo Ayala, professor of pathology and urology at BCM and first author of the article. "It represents an important new target in prostate cancer treatment, as prostate cancers are more aggressive when neurogenesis is present."

Ayala noted that this finding is comparable to the discovery of angiogenesis or the growth of new blood vessels. Both are part of the wound repair process.

"We also believe that axongenesis and neurogenesis is found not only in prostate cancer, but is potentially a more global phenomenon, particularly relating to those cancers that grow along nerve paths," said Ayala, also a researcher in the Dan L. Duncan Cancer Center at BCM.

Ayala and his colleagues studied the neurogenesis in tissue culture, in human tissues of patients who had had prostate cancer and compared to

prostate tissues from patients who had died of other ailments. They calculated the density of nerves in human prostate tissues, including those with prostate cancer. They found that nerve density was considerably higher in patients with prostate cancer and in precancerous lesions. As part of the study, he used an entire prostate gland to reconstruct the prostate and enable scientists to see the growth of nerves and axons in three-dimensions, a computerized process that took substantial continuous computer processing.

He and his colleagues have even identified a possible method of regulating the growth of new nerves and axons through a protein called semaphorin 4F. Semaphorins are embryologically active molecules that regulate nerve growth and direction. Most disappear in adults, but semaphoring 4F is active in wound repair. When prostate cancer cells overproduce semaphorin 4F, new nerves result. Blocking semaphoring 4F prevents the growth of new nerves.

Source: Baylor College of Medicine