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What is a Proton?

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To understand how protons fight cancer, start by remembering some basics from high school science class: Cells are made of molecules, molecules can be broken down into atoms, and atoms have a nucleus surrounded by spinning electrons. The nucleus is made up of neutrons and protons, a subatomic particle with a positive charge.

In proton beam therapy, protons are obtained from water through electrolysis, a method of separating bonded elements by passing an electrical current through them. Radiation—whether from accelerated protons or X-rays used in conventional radiation—is particularly harmful to DNA, a cell's genetic material. With damaged DNA, a cell can no longer divide and proliferate.

Of course, what kills a cancer cell can also kill a healthy cell. In both conventional radiation therapy and proton beam therapy, doctors try to selectively damage more cancer cells than nearby healthy cells. They're helped by the fact that normal cells are generally better than cancerous cells at repairing damage from radiation.