Different Skills, Common Goal

Teamwork yielding results in cancer research

One day more than a decade ago, Meredith Gunter shared an elevator with a cancer researcher.

She was headed to the fourth floor of the U.Va. Cancer Center to be treated for breast cancer. David Brautigan, a biochemist, was headed to his lab on one of the upper floors.

They chatted briefly, Gunter recalls. "Brautigan said, 'It's always good for those of us who are on the sixth and seventh floors to see those of you who get off on the fourth floor.'"

Gunter replied, "It's always good for those of us who get off on the fourth floor to know that there are people on the sixth and seventh floors spending every day of your lives trying to answer one question."

That question: How can we give more hope to cancer patients?

The answer is teamwork. Gunter helped start a volunteer organization called Patients and Friends of the U.Va. Cancer Center. It has raised more than $3 million since 1998 for cancer research, including breakthrough work that otherwise would have gone unfunded.

Among scientists themselves, teamwork also is vital.

"One thing that is unique—or at least distinctive—about research at the U.Va. Cancer Center is its multidisciplinary character," says Michael J. Weber, director of the center. "Much of what we do is built around teams of people with complementary skills. I think of us as the Academical Village of Science."

Here are four teams that are coming up with answers.

Target: Breast cancer

Team: Deborah Lannigan (cell and molecular biologist), Ian Macara (cell biologist), David Brenin (surgeon)

Research: They are growing "organoids" from human tissue to track cancer growth at the cellular level and synthesizing a compound derived from the Amazon jungle plant *Fosteronica Refracta* to stop the growth of breast cancer cells.

In layman's terms: U.Va. is pioneering a process to "grow" live, healthy breast tissue in the lab. By adding cancer cells to the tissue, they can see how cancer develops in human tissue rather than in mice. This breakthrough will be used to test the effectiveness of several therapies, including a compound discovered at U.Va. that inhibits the growth of breast cancer cells without harming healthy cells.

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Target: Optimizing cancer treatment options

Team: Dan Theodorescu (surgeon-scientist), Jae Lee (biostatistician)

Research: They are developing a computer algorithm to match the unique molecular and genetic signatures of a patient's cancer against the known cancer-killing properties of an array of chemotherapeutic drugs and other targeted agents.

In layman's terms: Each patient reacts differently to the same treatment because of genetic and other differences. Determining which cancer treatment to use is still largely based on trial and error. This team's research holds promise for fundamentally changing how drugs are selected to treat cancer and for speeding the identification of the most effective treatments.

Target: Developing cancer vaccines

Team: Craig Slingluff (surgeon-scientist), Don Hunt (chemist), Vic Engelhard (microbiologist and immunologist)

Research: The group has pioneered the development of vaccines that fight melanoma and other cancers. They were the first group to identify a peptide antigen in melanoma that can be targeted by T-lymphocytes, the cells capable of directly killing cancer cells.

In layman's terms: By identifying molecular targets on cancer cells, the team can use vaccines to muster the body's immune system in a "nontoxic war on cancer." Result: killing cancer cells without killing healthy tissue. Since 1996, the Human Immune Therapy Center has enrolled more than 500 patients in anti-cancer vaccine clinical trials.

Target: Pancreatic cancer

Team: Kim Kelly (biomedical engineer), J. Thomas Parsons (cancer biologist), Todd Bauer (surgeon-scientist)

Research: They are exploring the basic biology of pancreatic cancer, including identifying a protein (uPAR) that, when blocked, decreases the growth and metastasis of human pancreatic cancers in mice. They are evaluating signaling pathways in individual tumors to develop patient-specific targeted therapies and identifying early biomarkers that could make precancerous cells visible via MRI and PET scans.

In layman's terms: The five-year survival rate for pancreatic cancer patients is only 5 percent. Diagnosing pancreatic cancer early, preventing its spread and understanding the genetic profile of each patient's individual tumor can greatly improve treatment options and outcomes.