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Title of Entry: Ending Liver Cancer

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Ending Liver Cancer

Liver cancer is a devastating disease that attacks the liver and creates cancerous tumors on its surface or within it. The National Institute of Health estimates “... about 27,000 deaths are registered annually in the U. S. due to liver disease¹, ⁶.” My Aunt Lauren struggled with it for six years: “I was shocked when I first found out,” she said “I felt that I couldn't be the one to have such an unfortunate disease.” However, devoted research is being done that’s revealing and advancing methods such as liver transplantation, growing livers from scaffolds, and drug treatments that can safely shrink tumors without harming normal cells. Biomedical research will continue to provide the information needed to end liver cancer once and for all.

Although, liver cancer comes in two primary forms: hepatocellular carcinoma (tumors form on the liver’s surface) and intrahepatic cholangiocarcinoma (tumors form within the liver’). My aunt had an extremely rare type of cancer called carcinoid cancer. She had a slow-growing liver tumor that went unnoticed for years. She went through treatments such as Y-90 radiology (where a small amount of the radioactive element Yttrium-90 is injected into the tumor) and chemoembolization (blood vessels feeding the tumor are targeted with drugs and other methods to kill the tumor), which helped, but did not cure her disease. “At first, I wasn’t considering having a liver transplant, but after the other treatments didn’t work, I was willing to take it on.” Liver transplants are the only surefire way to cure liver cancer. My aunt experienced a rigorous screening process to see if she was a likely candidate. When she received the liver, she was cured permanently. But, the Radiologic Society of America estimates that 16,857
patients are awaiting a replacement liver while only 5,618 patients are receiving one
.
According to the Mayo Clinic: “At this time, the only definitive treatment of hepatic [liver] failure is liver transplantation.

The rarity of available livers for transplant has driven the development of other liver cancer-fighting methods. According to Doctors T.Yamashita of the Kanazawa University Hospital and X. W.Wang of the National Cancer Institute, an emerging technique to combat liver cancer is the ECM, or extracellular matrix. This takes the liver from pigs and strips them of hepatocytes (liver cells). The resulting structure is the “scaffold” of the liver. The patient’s liver cells would be grown on it in a lab. The resulting liver would not be rejected by the patient’s body, as it’s made up of the patient’s cells. This method would also combat the drastic liver shortage faced today by taking advantage of livers supplied from pigs.

Another emerging liver cancer combatant piloted by Dipanjan Pan of the University of Illinois Bioengineering Department is bexarotene, a drug that can safely kill tumors without harming normal liver cells. The drug is injected into the body in microscopic bubbles. When the bubbles have reached the tumor, ultrasound is used to burst them. This releases the drug on the tumor without any harm done to normal cells.

“Using an in vitro [Out-of-body] model of hepatocellular carcinoma and an in vivo [Inside-of-body] large animal model of liver ablation, we demonstrated the effectiveness of bexarotene prodrug nanobubbles when used in conjunction with catheter-based ultrasound, thereby highlighting the therapeutic promise of this trimodal [Triple-featured]
approach³." This method provides an approach that is more convenient to the patient than other methods.

In conclusion, the treatments and medicine resulting from biomedical research such as these are saving the lives of people like my aunt. Biomedical research has given hope to thousands who were previously given only a few months to live. I hope that research such as liver transplantation, the ECM, and the bexarotene drug continues so that eventually no one will ever have to suffer as my aunt did. Biomedical research will continue to provide the information needed to end liver cancer forever.
Reflection:

I chose to research liver cancer because it greatly impacted someone I loved, my aunt. I wanted to know more about her hardships with the disease, as I felt uninformed when she still had cancer. Creating an essay including a personal interview with her seemed like a good way to discover more about liver cancer and her experience with it. I’ve come to a realization that the websites I visited and the methods I found out about have kept my aunt alive to this day. I’m deeply thankful for all who commit to researching ways to save the lives of others. I no longer hear the topic of my aunt’s past sickness with a feeling of dread and sadness, but with interest and happiness that she’s alive today.

<http://www.mayoclinic.org/diseases-conditions/liver-cancer/basics/risk-factors/con-20025222>

<http://engineering.illinois.edu/news/article/14749>

Siebert, Lauren. Personal interview. 23 January 2016


Yagi, H. "Human-Scale Whole-Organ Bioengineering for Liver ..." 2013.
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3682787/>

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