Immunotherapy is now seemingly everywhere, with several treatments approved for various cancer types, including CAR T-cells, immune checkpoint inhibitors and more in development such as tumor infiltrating lymphocyte (TIL) therapy. TILs successfully cleared all tumors from a woman with metastatic breast cancer, in a research breakthrough which was one of the most reported in 2018, but as of yet, TILs have not been proven in larger-scale clinical trials. Over 2,500 trials using immunotherapy are now registered worldwide, but as the use of these treatments grows, there are still major questions to be answered. One particularly important to the use of immune checkpoint-blocking drugs such as those which target PD-1 or CTLA-4 is 'why do some patients respond whereas others do not?' Several research teams worldwide are currently grappling with this question, which is unlikely to have a single, clear answer, but I expect to see much more research published on this in 2019, which will hopefully start to benefit patients by identifying who will and won't respond to these expensive drugs. The liquid biopsy industry exploded in 2018, perhaps unsurprisingly given the market is expected to be worth over $2 billion annually by 2022. The promise is that eventually, we should be able to diagnose cancer with a simple blood test—earlier, more cheaply and even more accurately than we currently do. Research has suggested we could even use these tests to monitor the response of tumors to cancer treatment and when and if the tumor returns. However, the number of research papers, presentations at top conferences and news releases by the dozens of companies currently developing these technologies can make it a little overwhelming to figure out what is going on.

In 2019, two of the top liquid biopsy tests on the market had their efficacy called into question with researchers from Johns Hopkins suggesting that the two competing tests gave different results with the same patient samples. A claim which was then challenged by representatives from both companies. Liquid biopsy tests undoubtedly have huge potential and may indeed live up to their hype, but currently, the field is a little messy and difficult to understand for scientists, patients and oncologists who are not specialists. The American Society for Clinical Oncology (ASCO) issued a statement in March of this year essentially concluding that for most liquid biopsy tests there is currently not enough evidence to recommend their use in either the diagnosis or monitoring of cancer. Hopefully, 2019 brings greater clarity about how these tests can fit into the diagnosis and care of people with cancer and ASCO will be able to review their stance accordingly. For decades, cancer research has understandably been mainly focused on making sure as many people survive the disease as possible, but now with millions of cancer survivors in the world, a new research field looking at what actually happens to cancer survivors as a result of their treatments is growing at considerable speed. From a study which hopes to have found a solution to male infertility after childhood cancer treatment to work showing that some women with early-stage breast cancer can have less radiotherapy without compromising their chance of survival, 2018 was a good year for cancer survivorship research. The highlight, in my opinion, was work from Stanford University scientists that may have figured out why 'chemo brain' happens, one of the most commonly-reported side-effects that cancer survivors experience. Even better, the scientists suggest that it may be treatable. Acidity in cancer nests has been investigated for over 80 years, but anti-cancer chemotherapy specific to acidic microenvironments has not been developed. Acidification of cancer nests is generally less than 2 pH units and it has been argued that intracellular pH is not changed due to the cytosolic pH homeostasis. However, recent studies have revealed that cytosolic pH decreases with the acidification of extracellular environments, although the pH change in cytosolic space is less than that in the surroundings. For example, cytosolic pH values were reported to be 7.4 and

6.9 in media with a pH of 7.4 and 6.5, respectively. In another report, cytosolic pH values were 7.4 and 6.8 in media with a pH of 7.4 and 6.2, respectively. Many researchers had thought that such small pH changes do not affect cellular metabolisms, but the expression of many genes were found to increase under acidic conditions. These data suggest that some metabolic activities alter as the acidification of cancer nests, leading us to develop anti-cancer chemotherapy specific to acidic nests. Until now, four drugs have been found to have high efficacy to inhibit cancer progression under acidic conditions. These acidosis-dependent drugs have a great advantage to be less effective in normal tissues whose pH is slightly alkaline. On the basis of these findings, I would like to discuss the innovative chemotherapy specific to cancers progressing in acidified nests.

Medications with expanded adequacy to restrain disease cell expansion under acidic conditions have been recognized as of late. Such medications may effectsly affect typical tissues, whose pH is somewhat basic. Notwithstanding, their clinical application is as yet restricted. In this survey, late accomplishments in against malignant growth drugs with stamped viability under acidic conditions are summed up, and the clinical utilization of such acidosis-subordinate medications is talked about. The impact of acidosis on malignancy cell capacities has not been very much examined up to this point. One explanation might be that the pH change in disease homes is regularly under 1 pH unit. Another might be the contention that the pH in intracellular spaces isn't influenced by the fermentation of the environmental factors inside this thin scope of pH change. Cytosolic fermentation, be that as it may, was seen in malignancy cells with an abatement in the pH of the way of life medium. Cytosolic pH esteems were 7.4 and 6.9 in media with a pH of 7.4 and 6.5, separately. In another report, cytosolic pH esteems were 7.4 and 6.8 in media with a pH of 7.4 and 6.2, separately. These information propose that the pH homeostatic limit of the cytosolic space isn't sufficiently able to keep up a steady cytosolic pH. Along these lines, the cytosol might be fermented in acidic malignant growth homes.