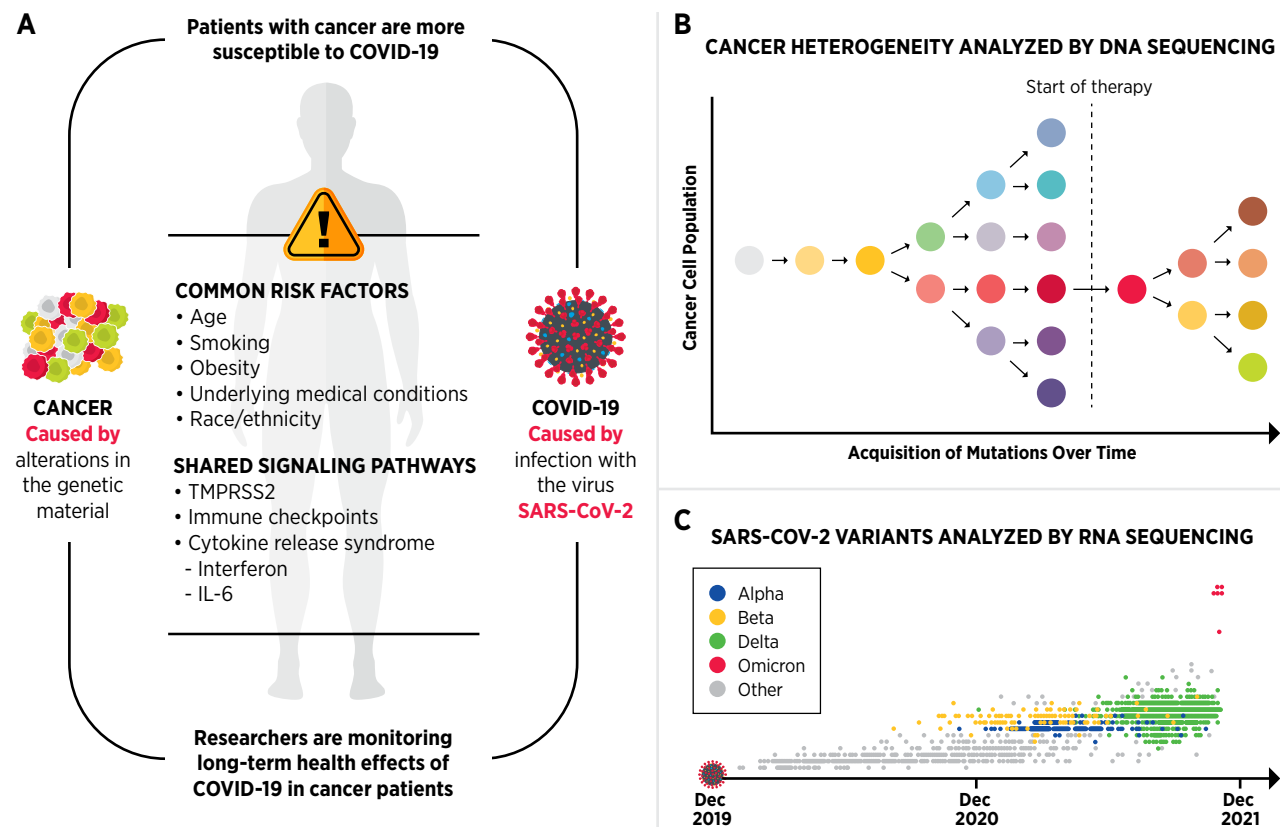


FIGURE 4 LESSONS FROM CANCER RESEARCH HELPED ADDRESS COVID-19



A. Knowledge derived from decades of cancer research has helped the medical research community respond to many of the challenges posed by COVID-19. It became evident quite early in the pandemic that there were parallels between COVID-19 and cancer. For example, several risk factors such as advanced age, smoking, and obesity, and certain underlying medical conditions increase risk for both diseases. In addition, researchers identified common cellular and molecular markers that are associated with the etiology and/or pathology of both diseases. These include the cell surface protein TMPRSS2 which has been long associated with prostate cancer and was also found to facilitate SARS-CoV-2 entry into human cells. Research discoveries in cancer immunology, e.g., how the immune system responds to cancer cells, and mechanisms deployed by tumors to evade the immune system, such as checkpoint inhibitors, have provided key insights into the immune response to COVID-19. Furthermore, cytokine release syndrome, a phenomenon mediated by an abnormal activation of the immune system observed in patients with cancer treated with certain immunotherapeutics, also occurs in patients with severe COVID-19. These shared pathways between cancer and COVID-19 have allowed cancer researchers to evaluate

the efficacy of several anticancer therapeutics for the treatment of COVID-19.

B. Beyond scientific discoveries, state-of-the-art technologies that are used to answer cancer's most elusive questions are now aiding public health experts to mitigate the spread of the pandemic. As one example, next-generation sequencing (NGS) is a comprehensive method for assessing the genetic alterations associated with tumors. The technology allows researchers to capture tumor heterogeneity—diversity in genetic alterations among different cancer cells within a tumor as between primary and metastatic tumors—and track these changes over time. The data provide insights on the chronology of tumor evolution and identify how cancer therapeutics might influence intratumor heterogeneity.

C. NGS technology has also played a pivotal role in addressing the SARS-CoV-2 pandemic. It has helped public health researchers sequence thousands of SARS-CoV-2 genomes worldwide, enabling a better understanding of the spread and evolution of the virus. Notably, NGS has been indispensable for tracing the emergence of new SARS-CoV-2 variants and using this information to better guide public health.