

## Overview

Early cancer detection is critical to reducing associated morbidity and mortality. Biomarkers are essential tools for this and have shown a significant increase in interest in the last few years. Pancreatic and liver cancer remain a notable challenge.

**Background:** Cancer biomarkers are biomolecules, cellular structures, or bioactivities that can provide information about cancer and are, therefore, essential tools for early detection.

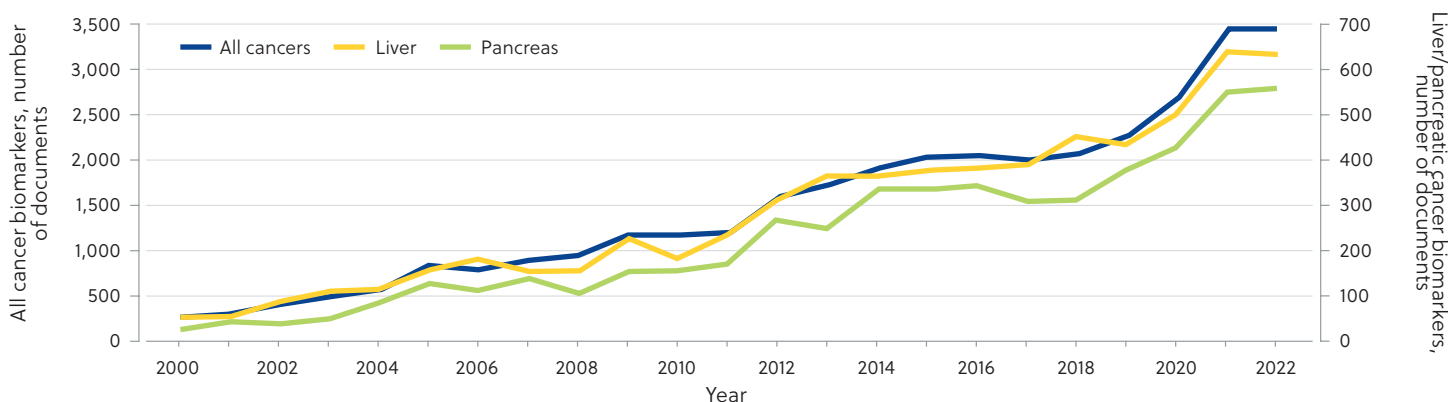
**Market potential:** There has been significant growth in biomarker research in recent years, though the number of patents has grown slowly. Capital investment has also been on the rise, with over \$16 billion invested in 2021–2022.

**Key benefits:** Effective biomarkers could help lead to earlier cancer detection, meaning higher survival rates, reduced need for invasive treatments, and lower emotional and financial burden.

**Key challenges:** Biomarkers require precise levels of specificity and sensitivity to be useful. The heterogeneity of cancer and variability in individuals, as well as time-consuming and costly validation, make the search even harder.

## Research trends over time

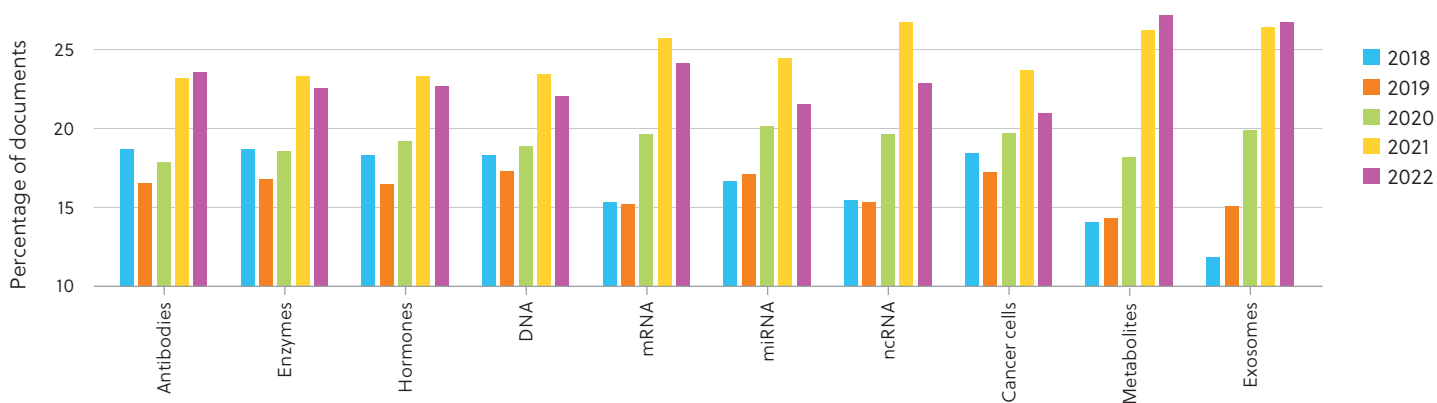
There has been a nearly 30% increase in journal articles in the last two years. Patent growth has been slower, indicating an accumulation stage of scientific knowledge preceding transfer into patentable applications.



Yearly growth of the number of documents (journal articles and patents) in the CAS Content Collection™ related to biomarkers for early cancer detection.

## Leading biomarker types

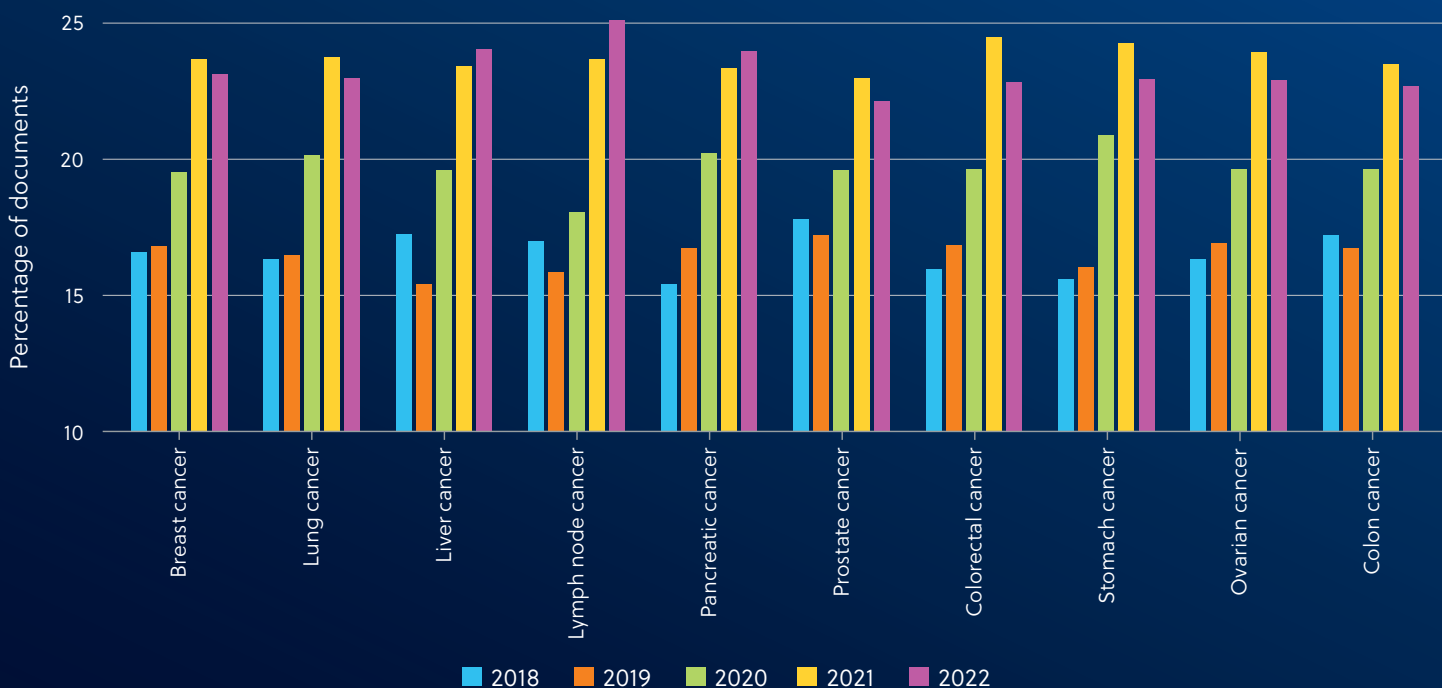
Typically, proteins are the most used biomarker type in cancer diagnostics, but in recent years, metabolites, exosomes, and RNAs – specifically mRNA and ncRNA – have emerged as attractive candidates according to yearly growth.



Yearly growth for the last five years (2018–2022) in publications in the CAS Content Collection related to various biomarker types for cancer diagnosis.

## Cancers of interest

All major cancer types marked substantial growth in the recent three-year period, but lymph node cancer, pancreatic cancer, and liver cancer are drawing attention with a steady growth in recent publications.



Yearly growth of biomarker-related documents for the last five years (2018–2022).

## Insights in pancreatic and liver cancer

Pancreatic and liver cancers are areas of special interest, both known to be remarkably difficult to detect early and with high morbidity and mortality. Both need reliable biomarkers with high sensitivity and specificity, and biomarkers in exploration so far lack stringent validation.

Early diagnostic testing for pancreatic and liver cancers is starting to see increased numbers, with a sharp growth in the past few years. Most are still in recruiting status.

|                          | Not yet recruiting | Recruiting | Active | Complete |
|--------------------------|--------------------|------------|--------|----------|
| <b>Pancreatic cancer</b> | 2%                 | 60%        | 10%    | 28%      |
| <b>Liver cancer</b>      | 3%                 | 57%        | 18%    | 22%      |

Percentage of early cancer diagnostic clinical trials focused on pancreatic and liver cancer in various statuses.

## Looking ahead

With advancements in technology and understanding, we have the potential to significantly reduce cancer-related morbidity and mortality in the future. However, challenges remain, including the time-consuming and costly validation process needed for new biomarkers. Continued investment will be key to realizing the full potential of biomarkers in cancer care.

Learn more at [cas.org/insights](https://cas.org/insights)

More comprehensive information and references can be found at [cas.org/insights](https://cas.org/insights)

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