Current and future research directions in cellular metabolism of colorectal cancer: A bibliometric analysis

Jiang BW et al. Cellular metabolism in CRC
Abstract
The primary aim of this study was to analyze the evolving trends and key focal points in research on cellular metabolism of colorectal cancer (CRC). Relevant publications on cellular metabolism in CRC were sourced from the Science Citation Index Expanded within the Web of Science Core Collection database. Bibliometric analysis and visualization were conducted using VOSviewer (version 1.6.18) software and CiteSpace 6.1.R6 (64-bit) Basic. A comprehensive compilation of 4722 English-language publications, covering the period from January 1, 1991 to December 31, 2022, was carefully identified and included in the analysis. Among the authors, “Ogino, Shuji” contributed the most publications in this field, while “Giovannucci, E” garnered the highest number of citations. The journal “Cancer Research” ranked first in both publication volume and citations. Institutionally, “Shanghai Jiao Tong University” emerged as the top contributor in terms of published articles, while “Harvard University” led in citation impact. In country-based analysis, the United States held the top position in both publication output and citations, closely followed by China. The increasing recognition of the significance of cellular metabolism in CRC underscores its potential for novel therapeutic approaches aimed at improving CRC management and prognosis.

Key Words: Cellular metabolism; Colorectal cancer; Bibliometric analysis; Metabolic reprogramming; Cellular metabolism

Jiang BW, Zhang XH, Ma R, Luan WY, Miao YD. Current and future research directions in cellular metabolism of colorectal cancer: A bibliometric analysis. World J Gastrointest Oncol 2024; In press

Core Tip: Cellular metabolism encompasses intricate mechanisms that significantly contribute to the development of colorectal cancer. This study employs an advanced bibliometric approach to explore the evolving paradigms and prominent research areas
within cellular metabolism research, particularly in the context of colorectal cancer. The findings aim to offer insights and directions for future research in this field.

TO THE EDITOR

We recently examined the scholarly work by Liu et al[1] titled “Global research trends and prospects of cellular metabolism in colorectal cancer”. The primary aim of this study was to analyze evolving trends and focal points in cellular metabolism research specific to colorectal cancer (CRC). Metabolic reprogramming is a hallmark of cancer, and is particularly in CRC initiation and progression. The unique metabolic characteristics of intestinal stem cells contribute to the limited efficacy of traditional therapies against CRC[2]. Key metabolic features of CRC cells include heightened glycolytic activity, exemplified by the pervasive Warburg effect[3]. Additionally, alterations in lipid metabolism promote the utilization of glycolytic intermediates for de novo lipid synthesis[4]. This increased lipid accumulation supports tumor cell membrane formation and various signaling processes that are critical for CRC initiation and progression[5]. While we acknowledge the significant contributions of Liu et al’s investigation, we would like to offer several thoughtful recommendations regarding the information retrieval methodologies employed in their study[1].

In the bibliometric research, the careful design of search strategies is crucial. The authors use the Web of Science Core Collection (WoSCC) as the primary data source, which we believe was a prudent decision. However, WoSCC comprises at least 10 subdatabases, including the Science Citation Index Expanded, Social Sciences Citation Index, among others. We believe that incorporating all of these subdatabases in the article retrieval may not be necessary or appropriate. For example, the retrieval formula used by the authors did not yield any relevant studies in Adolescent Health Concern Inventory, CCR-Expanded, or IC[6,7]. Supporting this view, some scholars advise against using a wide array of databases with different types and levels in a single bibliometric analysis[8,9]. Of these subdatabases, Science Citation Index Expanded is
regarded as the most appropriate and widely accepted choice for bibliometric research[10,11].

Another critical consideration in bibliometric research is the appropriateness of the topic search approach. The topic search method defines a relevant publication if the search word is found in “Title (TI)”, “Abstract (AB)”, “Author Keywords (AK)”, or “Keywords Plus (KP)”. It is worth noting that “KP” is produced by WoS CC’s auto-algorithm without any author involvement. Therefore, including “KP” in the search process may inadvertently retrieve numerous extraneous publications[12]. Based on our experience, a more prudent approach relies solely on “TI”, “AB”, and “AK” as qualifiers. This strategy ensures a more precise and semantically meaningful dataset for bibliometric analysis[7,9-11].

It is crucial to acknowledge that the success of a search strategy depends on its thoroughness, as an overly simplistic approach might inadvertently miss relevant publications. In the study by Liu et al[1], the authors’ exclusive use of the terms “colorectal cancer” OR “colorectal carcinoma” may be insufficient for capturing all relevant research. Using double quotes around phrases like “amino acid metabolism” ensures that the search retrieves papers specifically related to that phrase, rather than splitting the search into individual words (e.g., “amino”, “acid”, and “metabolism”), which could yield less accurate results. Finally, it is important to clarify the precise timeframe for the inclusion of literature.

To refine the retrieval strategy, we propose incorporating synonymous terms and nomenclature associated with “colorectal cancer” and “metabolism” into the search equation. For “colorectal cancer”, additional terms such as “colorectal neoplasm”, “colon cancer”, and others should be considered. Similarly, for “metabolism”, terms like “cellular metabolism”, “Metabolic reprogramming”, and “cell metabolism”, among others, could be included. Furthermore, given that terms may have both plural and singular variations, the use of wildcards (e.g., “*”) can be beneficial. For instance, “colorectal cancer*” would capture both “colorectal cancer” and “colorectal cancers”. Our proposed detailed retrieval formula is summarized in Table 1.

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By incorporating a wider array of relevant terminologies, our refined search query enabled a more exhaustive examination of the pertinent literature. This search, covering articles from January 1, 1991, to December 31, 2022, and was conducted on April 7, 2024, yielded a total of 4978 records. After meticulously excluding diverse types of literature and non-English studies, we retained 4722 publications for analysis, comprising 4073 articles and 685 reviews. The annual publication trends are illustrated in Figure 1.

Unlike the findings of Liu et al[1], our study utilized a more refined retrieval scope focusing on “TI/AK/AB”, which resulted in identifying a more accurate set of studies on cellular metabolism in CRC (7354 vs 4722 publications). This significant difference in the number of identified publications can greatly influence various quantitative metrics, including those related to the most prolific countries/regions, institutions, authors, cited-authors, source, cited academic journals, clusters, co-occurrence keyword, and bursts. Hence, to reduce potential bias, it is crucial to meticulously develop an appropriate retrieval formula when performing bibliometric analyses.

In conclusion, we congratulate Liu et al[1] for their meticulous work, particularly their innovative bibliometric analysis of subspecialty directions in the field of CRC metabolism. However, we believe that our approach enhances the precision and accuracy of data analysis regarding research trends in “cellular metabolism of colorectal cancer” over the last three decades.
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