ISSN 1948-5204 (online)

World Journal of *Gastrointestinal Oncology*

World J Gastrointest Oncol 2024 November 15; 16(11): 4300-4531

Published by Baishideng Publishing Group Inc

World Journal of Gastrointestinal Oncology

Contents

Monthly Volume 16 Number 11 November 15, 2024

EDITORIAL

REVIEW

MINIREVIEWS

ORIGINAL ARTICLE

Retrospective Study

World Journal of Gastrointestinal Oncology

Monthly Volume 16 Number 11 November 15, 2024

Contents

World Journal of Gastrointestinal Oncology

Monthly Volume 16 Number 11 November 15, 2024

Contents

LETTER TO THE EDITOR

World Journal of Gastrointestinal Oncology

Monthly Volume 16 Number 11 November 15, 2024

Contents

ABOUT COVER

AIMS AND SCOPE

The primary aim of *World Journal of Gastrointestinal Oncology* (*WJGO*, *World J Gastrointest Oncol*) is to provide scholars and readers from various fields of gastrointestinal oncology with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJGO mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal oncology and covering a wide range of topics including liver cell adenoma, gastric neoplasms, appendiceal neoplasms, biliary tract neoplasms, hepatocellular carcinoma, pancreatic carcinoma, cecal neoplasms, colonic neoplasms, colorectal neoplasms, duodenal neoplasms, esophageal neoplasms, gallbladder neoplasms, *etc*.

INDEXING/ABSTRACTING

The *WJGO* is now abstracted and indexed in PubMed, PubMed Central, Science Citation Index Expanded (SCIE, also known as SciSearch®), Journal Citation Reports/Science Edition, Scopus, Reference Citation Analysis, China Science and Technology Journal Database, and Superstar Journals Database. The 2024 edition of Journal Citation Reports® cites the 2023 journal impact factor (JIF) for *WJGO* as 2.5; JIF without journal self cites: 2.5; 5-year JIF: 2.8; JIF Rank: 71/143 in gastroenterology and hepatology; JIF Quartile: Q2; and 5-year JIF Quartile: Q2. The *WJGO*'s CiteScore for 2023 is 4.2 and Scopus CiteScore rank 2023: Gastroenterology is 80/167; Oncology is 196/404.

RESPONSIBLE EDITORS FOR THIS ISSUE

NAME OF JOURNAL
World Journal of Gastrointestinal Oncology

ISSN
ISSN 1948-5204 (online)

LAUNCH DATE
February 15, 2009

FREQUENCY
Monthly

EDITORS-IN-CHIEF
Monjur Ahmed, Florin Burada

EDITORIAL BOARD MEMBERS
https://www.wjgnet.com/1948-5204/editorialboard.htm

PUBLICATION DATE
November 15, 2024

INSTRUCTIONS TO AUTHORS
https://www.wjgnet.com/bpg/gerinfo/204

GUIDELINES FOR ETHICS DOCUMENTS
https://www.wjgnet.com/bpg/GerInfo/287

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH
https://www.wjgnet.com/bpg/gerinfo/240

PUBLICATION ETHICS
https://www.wjgnet.com/bpg/GerInfo/288

PUBLICATION MISCONDUCT
https://www.wjgnet.com/bpg/gerinfo/208

ARTICLE PROCESSING CHARGE
https://www.wjgnet.com/bpg/gerinfo/242

STEPS FOR SUBMITTING MANUSCRIPTS
https://www.wjgnet.com/bpg/GerInfo/239

ONLINE SUBMISSION
https://www.f6publishing.com

World Journal of Gastrointestinal Oncology

Submit a Manuscript: https://www.f6publishing.com

World J Gastrointest Oncol 2024 November 15; 16(11): 4514-4517

DOI: 10.4251/wjgo.v16.i11.4514

ISSN 1948-5204 (online)

LETTER TO THE EDITOR

Vascular endothelial growth factor pathway's influence on bevacizumab efficacy in metastatic colorectal cancer treatment

Yuan Qin, Fu-Yuan Ma, Zhi Zhang, Chen-Hao Zhao, Biao Huang

Specialty type: Oncology

Provenance and peer review: Invited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's classification

Scientific Quality: Grade B
Novelty: Grade A
Creativity or Innovation: Grade B
Scientific Significance: Grade A

P-Reviewer: Fang J

Received: July 24, 2024
Revised: September 17, 2024
Accepted: September 25, 2024
Published online: November 15, 2024
Processing time: 92 Days and 20.6 Hours

Yuan Qin, Fu-Yuan Ma, Zhi Zhang, Chen-Hao Zhao, Biao Huang, College of Life Sciences and Medicine, Zhejiang Sci-Tech University, Hangzhou 310018, Zhejiang Province, China

Corresponding author: Biao Huang, PhD, Research Fellow, College of Life Sciences and Medicine, Zhejiang Sci-Tech University, No. 928, No. 2 Street, Qiantang District, Hangzhou 310018, Zhejiang Province, China. jswxhb@163.com

Abstract

In this article, an article published in the *World Journal of Gastrointestinal Oncology*, which focuses on whether the expression of programmed death-ligand 1 (PD-L1) affects the effectiveness of chemotherapy regimens, including bevacizumab, in treating patients with colorectal cancer (CRC). Through neutralization of vascular endothelial growth factor (VEGF), bevacizumab inhibits tumor angiogenesis, impairing neovascularization and thereby depriving the tumor of essential nutrients and oxygen. Conversely, PD-L1 binding to VEGF receptor 2 promotes angiogenesis, supporting tumor vasculature. The interplay between these pathways complicates the assessment of bevacizumab's efficacy in cancer therapy, notably in CRC, where VEGF and PD-L1 significantly affect treatment response. This review examines metastatic CRC treatment strategies, focusing on bevacizumab's mechanism of action and the role of PD-L1 in this therapeutic context.

Key Words: Bevacizumab; Chemotherapy; Metastatic colorectal cancer; PD-1/PD-L1 axis; Therapeutic approach; Vascular endothelial growth factor

Core Tip: In the management of colorectal carcinoma, bevacizumab wields its therapeutic impact *via* the neutralization of vascular endothelial growth factor (VEGF), a paramount mediator of intratumoral angiogenesis. This inhibitory action on VEGF obstructs neovascularization, consequently sequestering the essential sustenance of nutrients and oxygen requisite for tumoral proliferation and viability. Contrarily, the interaction between programmed death-ligand 1 and VEGF receptor 2 catalyzes the genesis of novel vasculature that sustains and nurtures the neoplasm, thereby potentiating angiogenic processes.

Citation: Qin Y, Ma FY, Zhang Z, Zhao CH, Huang B. Vascular endothelial growth factor pathway's influence on bevacizumab efficacy in metastatic colorectal cancer treatment. *World J Gastrointest Oncol* 2024; 16(11): 4514-4517
URL: https://www.wjgnet.com/1948-5204/full/v16/i11/4514.htm
DOI: https://dx.doi.org/10.4251/wjgo.v16.i11.4514

TO THE EDITOR

Colorectal cancer (CRC), a malignancy that predominantly affects the colon and rectal regions, is the third most common cancer worldwide. As per the authoritative global cancer statistics documented in 2024, the disease trajectory of CRC has undergone a remarkable shift since the late 1990s. Initially, it was identified as the fourth foremost contributor to cancer-related fatalities among men and women under the age of 50 years. However, in contemporary times, CRC has ascended to the apex as the primary cause of cancer-related mortality in males, it also ranks second in females, underscoring its escalating impact on public health across demographics[1]. Among patients diagnosed with CRC, nearly one-quarter present with metastatic disease (metastatic CRC, mCRC) at the onset of symptoms, and within this group, approximately 20% were initially diagnosed with localized disease that subsequently progressed to stage IV. Stage IV diseases portend a poor prognosis, with an estimated 5-year survival rate of merely 14%[2]. Presently, the therapeutic landscape for CRC is multifaceted, featuring a spectrum of treatment modalities designed to address the complex nature of this malignancy. These modalities include definitive surgical resection, cytotoxic chemotherapy, precision-targeted therapies, and immunotherapeutic interventions. Contemporary oncological practice often employs a multimodal approach, integrating multiple treatment strategies in a coordinated fashion to optimize patient outcomes and survival rates. This comprehensive care model acknowledges the heterogeneity of CRC and tailors the therapeutic plan to the unique characteristics of each patient's disease, aiming to maximize therapeutic efficacy while minimizing adverse effects[3]. Therapeutic strategies for CRC are customized to match the disease's stage. In stage IV mCRC, where malignancy spreads systemically, surgery alone is inadequate. Initial treatment thus favors a combined therapy approach, integrating chemotherapy, targeted treatments, and immunotherapies to optimize control and improve the quality of life of patients with mCRC.

Combination therapy for MCRC

In efforts to enhance frontline therapies for resectable mCRC, core research aims at immediate tumor containment, symptom alleviation, disease stabilization, and minimalization of metastatic spread before surgery. Therapeutic approaches now synthesize traditional chemotherapy with innovative molecularly targeted drugs, remakably improving response rates, extending progression-free survival (PFS) periods, and crucially enhancing overall survival (OS) outcomes for patients with mCRC, signaling a pivotal evolution in the treatment of advanced colorectal malignancies[4]. Regarding chemotherapy protocol choices in mCRC, FOLFOX and FOLFIRI exhibit comparable efficacy but distinct toxicity profiles. Their combination with targeted therapies is essential in mCRC management[5-7]. Selecting between them demands a thorough assessment of patient demographics, health status, comorbidities, personal inclinations, and considerations of drug-related toxicities and accessibility. On the basis of the distinct stages of mCRC, a comprehensive evaluation approach is adopted, integrating molecular biological characteristics, drug tolerance, tumor burden, and the patient's overall health condition to formulate the most appropriate treatment regimen. Currently, a plethora of combination therapy options are available, encompassing various permutations, such as quadruple therapy with FOLFIRINOX plus bevacizumab or cetuximab; triple therapy involving fluoropyrimidines in conjunction with oxaliplatin or irinotecan and either bevacizumab, cetuximab, or panitumumab; and dual therapy consisting of capecitabine paired with bevacizumab [3]. Comparable in prolonging PFS, these regimens exhibit unique variations in adverse effects and response rates. The most suitable treatment is matched through meticulous patient-specific assessments. The targeted drugs within these combinations inhibit critical pathways, such as epidermal growth factor receptor (EGFR), vascular endothelial growth factor (VEGF), and B-Raf proto-oncogene, serine/threonine kinase (BRAF), which synergistically attack tumors for enhanced and expanded therapeutic effects, delivering anticipated clinical successes.

Targeted therapeutic pathways for MCRC

Angiogenesis in tumors signifies cancer progression[8,9]. Physiologically, angiogenesis is regulated by a balance between pro- and anti-angiogenic factors[10], with VEGF signaling being a cardinal pathway. The VEGF signaling network encompasses secreted proteins, such as VEGF-A, VEGF-B, VEGF-C, VEGF-D, and placental growth factor, along with receptor tyrosine kinases, including VEGFR-1, VEGFR-2, and VEGFR-3[10,11]. These components serve as pivotal regulators of the angiogenic process and play a significant role in the therapy of mCRC, marking them as potential therapeutic targets[12,13]. Bevacizumab, as an angiogenesis-targeting agent, exerts its therapeutic effects primarily by precisely obstructing the neovascularization process in tumors through specifically binding to VEGF-A, effectively neutralizing VEGF's biological activity and thereby preventing its interaction with surface receptors, ultimately inhibiting the formation of new blood vessels[14]. Given that tumor proliferation and metastasis are heavily reliant on nutrients and oxygen delivered *via* neo-angiogenesis, this mechanism significantly retards tumor progression. As a result, when combined with chemotherapy, bevacizumab, which is an anti-VEGF monoclonal antibody, becomes a cornerstone treatment strategy for mCRC because it has been proven to substantially improve OS in patients. Despite the proven extension of survival in many patients through anti-angiogenic therapy, particularly the blockade of VEGF-A, angiogenesis eventually resumes in most individuals, a phenomenon attributed to various known resistance mechanisms impacting VEGF-targeted treatments[15]. Currently, research on the biomarkers for mCRC is actively underway[16].

However, no biomarker has yet been identified that can accurately predict which patients may respond to anti-angiogenic therapy and develop resistance. Therefore, although significant strides have been achieved in the field, further exploration is still required regarding how to more precisely select patients suitable for such therapies and how to overcome resistance. The article approaches immunotherapy as a pivotal point, focusing on the modulation of tumor immune responses through targeting programmed death 1 (PD-1) and its ligand PD-ligand 1 (PD-L1). The expression of PD-L1 is regulated by multiple pathways, and lower expression typically correlates with reduced T-cell infiltration, often leading to superior therapeutic outcomes compared with that in tumors with higher expression levels[17,18]. Anti-VEGF monoclonal antibodies not only suppress angiogenesis and reduce tumor activity but also induce hypoxia, which facilitates enhanced sensitivity of effector T cells to PD-1/PD-L1 inhibition[5,19,20]. PD-L1 may engage in interactions with VEGF, thereby facilitating angiogenesis and metastatic processes in neoplastic cells[21]. Hence, the interplay between PD-L1 and VEGF signaling pathways indicates that anti-PD-L1/PD-1 therapy may have a potential combined effect with anti-angiogenic therapy in various types of tumors. The study concludes that the efficacy of bevacizumab is not correlated with PD-L1 expression, thus, irrespective of the expression levels of PD-L1, the combination of chemotherapy with bevacizumab can be deemed a first-line therapeutic option for patients with metastatic CRC. Although the article does not fully achieve its research goals, it provides novel perspectives for subsequent clinical treatments by highlighting the connection between PD-L1 immune checkpoint regulation and VEGF-mediated angiogenesis pathways, thereby broadening the therapeutic landscape in clinical practice.

CONCLUSION

Within the intricate landscape of the tumor microenvironment, hypoxic conditions spur cancer cells and vascular endothelial cells to secrete VEGF. This potent cytokine catalyzes angiogenesis, fueling tumor expansion, tumor invasion, and the dissemination of malignant cells to distant sites. The advent of VEGF inhibitors has revolutionized cancer therapy by reprogramming the immunosuppressive milieu of tumors, fostering an environment amenable to immune activation. Emerging evidence suggests that combining VEGF inhibition with the blockade of the interaction between PD-L1 and its receptor PD-1 may produce additive or even cooperative benefits, thereby enhancing the efficacy of cancer treatments. This study specifically investigated the implications of PD-L1 expression in the context of mCRC therapy, utilizing bevacizumab—a targeted VEGF inhibitor—concomitantly with chemotherapy. Special emphasis was placed on elucidating the interconnections among VEGF signaling, PD-L1, and VEGFR2. Although PD-L1 expression did not markedly influence the clinical outcomes of bevacizumab in combination with chemotherapy, this finding illuminated promising avenues for future research. It encourages the scientific community to delve deeper into the complex interplay between diverse biomarkers and pivotal oncologic pathways, encompassing VEGF, EGFR, and BRAF mutations, with the ultimate goal of unearthing novel therapeutic strategies. Advancements in therapeutic optimization and precision medicine are anticipated through meticulous analysis of these biomarkers as conduits and evaluation of the synergistic potential of inhibitors paired with chemotherapy in mCRC. Such endeavors not only shed light on the convoluted molecular underpinnings of cancer but also herald a new era of personalized medicine, wherein tailored treatment regimens are crafted in accordance with the unique biomarker signatures of individual patients. This comprehensive strategy holds the promise of significantly boosting survival rates and improving the quality of life of those battling mCRC while offering critical insights that could inform the development of treatment paradigms for a broadened spectrum of malignancies.

FOOTNOTES

Author contributions: Huang B and Qin Y designed this study; Qin Y and Ma FY contributed to the writing and editing of the manuscript; Zhang Z and Zhao CH conducted the reference analyses.

Supported by The Natural Science Foundation of Zhejiang Province, No. LQ23H050005; The Scientific Research Project of Zhejiang Provincial Education Department, No. Y202250731 and No. Y202353130; China Students' Innovation and Entrepreneurship Training Program, No. 202310338044; and China Postdoctoral Science Foundation, No. 2022M721720.

Conflict-of-interest statement: The authors declare that they have no conflicts of interest.

Country of origin: China

ORCID number: Yuan Qin 0000-0002-5651-8293; Biao Huang 0000-0003-1883-0670.

S-Editor: Liu H
L-Editor: A

P-Editor: Zhao S

REFERENCES

1 **Siegel RL**, Giaquinto AN, Jemal A. Cancer statistics, 2024. *CA Cancer J Clin* 2024; **74**: 12-49 [PMID: 38230766 DOI: 10.3322/caac.21820]

2 **Riihimäki M**, Hemminki A, Sundquist J, Hemminki K. Patterns of metastasis in colon and rectal cancer. *Sci Rep* 2016; **6**: 29765 [PMID: 27416752 DOI: 10.1038/srep29765]

3 **Benson AB**, Venook AP, Adam M, Chang G, Chen YJ, Ciombor KK, Cohen SA, Cooper HS, Deming D, Garrido-Laguna I, Grem JL, Haste P, Hecht JR, Hoffe S, Hunt S, Hussan H, Johung KL, Joseph N, Kirilcuk N, Krishnamurthi S, Malla M, Maratt JK, Messersmith WA, Meyerhardt J, Miller ED, Mulcahy MF, Nurkin S, Overman MJ, Parikh A, Patel H, Pedersen K, Saltz L, Schneider C, Shibata D, Shogan B, Skibber JM, Sofocleous CT, Tavakkoli A, Willett CG, Wu C, Gurski LA, Snedeker J, Jones F. Colon Cancer, Version 3.2024, NCCN Clinical Practice Guidelines in Oncology. *J Natl Compr Canc Netw* 2024; **22** [PMID: 38862008 DOI: 10.6004/jnccn.2024.0029]

4 **Ribecco AS**, Pino MS, Cipriani G, Marinozzi C, Fioretto L. Molecularly targeted therapy: toxicity and quality of life considerations in advanced colorectal cancer. *Expert Rev Anticancer Ther* 2013; **13**: 1181-1191 [PMID: 24134420 DOI: 10.1586/14737140.2013.837667]

5 **Hack SP**, Zhu AX, Wang Y. Augmenting Anticancer Immunity Through Combined Targeting of Angiogenic and PD-1/PD-L1 Pathways: Challenges and Opportunities. *Front Immunol* 2020; **11**: 598877 [PMID: 33250900 DOI: 10.3389/fimmu.2020.598877]

6 **Colucci G**, Gebbia V, Paoletti G, Giuliani F, Caruso M, Gebbia N, Cartenì G, Agostara B, Pezzella G, Manzione L, Borsellino N, Misino A, Romito S, Durini E, Cordio S, Di Seri M, Lopez M, Maiello E, Montemurro S, Cramarossa A, Lorusso V, Di Bisceglie M, Chiarenza M, Valerio MR, Guida T, Leonardi V, Pisconti S, Rosati G, Carrozza F, Nettis G, Valdesi M, Filippelli G, Fortunato S, Mancarella S, Brunetti C; Gruppo Oncologico Dell'Italia Meridionale. Phase III randomized trial of FOLFIRI versus FOLFOX4 in the treatment of advanced colorectal cancer: a multicenter study of the Gruppo Oncologico Dell'Italia Meridionale. *J Clin Oncol* 2005; **23**: 4866-4875 [PMID: 15939922 DOI: 10.1200/JCO.2005.07.113]

7 **Tournigand C**, André T, Achille E, Lledo G, Flesh M, Mery-Mignard D, Quinaux E, Couteau C, Buyse M, Ganem G, Landi B, Colin P, Louvet C, de Gramont A. FOLFIRI followed by FOLFOX6 or the reverse sequence in advanced colorectal cancer: a randomized GERCOR study. *J Clin Oncol* 2004; **22**: 229-237 [PMID: 14657227 DOI: 10.1200/JCO.2004.05.113]

8 **Hanahan D**, Weinberg RA. Hallmarks of cancer: the next generation. *Cell* 2011; **144**: 646-674 [PMID: 21376230 DOI: 10.1016/j.cell.2011.02.013]

9 **Griffioen AW**, Molema G. Angiogenesis: potentials for pharmacologic intervention in the treatment of cancer, cardiovascular diseases, and chronic inflammation. *Pharmacol Rev* 2000; **52**: 237-268 [PMID: 10835101]

10 **Macarulla T**, Montagut C, Sánchez-Martin FJ, Granja M, Verdaguer H, Sastre J, Tabernero J. The role of PIGF blockade in the treatment of colorectal cancer: overcoming the pitfalls. *Expert Opin Biol Ther* 2020; **20**: 15-22 [PMID: 31608707 DOI: 10.1080/14712598.2020.1677603]

11 **Lai E**, Liscia N, Donisi C, Mariani S, Tolu S, Pretta A, Persano M, Pinna G, Balconi F, Pireddu A, Impera V, Dubois M, Migliari M, Spanu D, Saba G, Camera S, Musio F, Ziranu P, Puzzoni M, Demurtas L, Pusceddu V, Dettori M, Massa E, Atzori F, Dessì M, Astara G, Madeddu C, Scartozzi M. Molecular-Biology-Driven Treatment for Metastatic Colorectal Cancer. *Cancers (Basel)* 2020; **12** [PMID: 32413973 DOI: 10.3390/cancers12051214]

12 **Kanat O**, Ertas H. Existing anti-angiogenic therapeutic strategies for patients with metastatic colorectal cancer progressing following first-line bevacizumab-based therapy. *World J Clin Oncol* 2019; **10**: 52-61 [PMID: 30815371 DOI: 10.5306/wjco.v10.i2.52]

13 **Rubbia-Brandt L**, Giostra E, Brezault C, Roth AD, Andres A, Audard V, Sartoretti P, Dousset B, Majno PE, Soubrane O, Chaussade S, Mentha G, Terris B. Importance of histological tumor response assessment in predicting the outcome in patients with colorectal liver metastases treated with neo-adjuvant chemotherapy followed by liver surgery. *Ann Oncol* 2007; **18**: 299-304 [PMID: 17060484 DOI: 10.1093/annonc/mdl386]

14 **Haibe Y**, Kreidieh M, El Hajj H, Khalifeh I, Mukherji D, Temraz S, Shamseddine A. Resistance Mechanisms to Anti-angiogenic Therapies in Cancer. *Front Oncol* 2020; **10**: 221 [PMID: 32175278 DOI: 10.3389/fonc.2020.00221]

15 **Taieb J**, Jung A, Sartore-Bianchi A, Peeters M, Seligmann J, Zaanan A, Burdon P, Montagut C, Laurent-Puig P. The Evolving Biomarker Landscape for Treatment Selection in Metastatic Colorectal Cancer. *Drugs* 2019; **79**: 1375-1394 [PMID: 31347092 DOI: 10.1007/s40265-019-01165-2]

16 **Kim ST**, Cristescu R, Bass AJ, Kim KM, Odegaard JI, Kim K, Liu XQ, Sher X, Jung H, Lee M, Lee S, Park SH, Park JO, Park YS, Lim HY, Lee H, Choi M, Talasaz A, Kang PS, Cheng J, Loboda A, Lee J, Kang WK. Comprehensive molecular characterization of clinical responses to PD-1 inhibition in metastatic gastric cancer. *Nat Med* 2018; **24**: 1449-1458 [PMID: 30013197 DOI: 10.1038/s41591-018-0101-z]

17 **Schoemig-Markiefka B**, Eschbach J, Scheel AH, Pamuk A, Rueschoff J, Zander T, Buettner R, Schroeder W, Bruns CJ, Loeser H, Alakus H, Quaas A. Optimized PD-L1 scoring of gastric cancer. *Gastric Cancer* 2021; **24**: 1115-1122 [PMID: 33954872 DOI: 10.1007/s10120-021-01195-4]

18 **de Almeida PE**, Mak J, Hernandez G, Jesudason R, Herault A, Javinal V, Borneo J, Kim JM, Walsh KB. Anti-VEGF Treatment Enhances CD8(+) T-cell Antitumor Activity by Amplifying Hypoxia. *Cancer Immunol Res* 2020; **8**: 806-818 [PMID: 32238381 DOI: 10.1158/2326-6066.CIR-19-0360]

19 **Yi M**, Niu M, Xu L, Luo S, Wu K. Regulation of PD-L1 expression in the tumor microenvironment. *J Hematol Oncol* 2021; **14**: 10 [PMID: 33413496 DOI: 10.1186/s13045-020-01027-5]

20 **Yang Y**, Xia L, Wu Y, Zhou H, Chen X, Li H, Xu M, Qi Z, Wang Z, Sun H, Cheng X. Programmed death ligand-1 regulates angiogenesis and metastasis by participating in the c-JUN/VEGFR2 signaling axis in ovarian cancer. *Cancer Commun (Lond)* 2021; **41**: 511-527 [PMID: 33939321 DOI: 10.1002/cac2.12157]

21 **Kang SW**, Lim SH, Kim MJ, Lee J, Park YS, Lim HY, Kang WK, Kim ST. Efficacy of chemotherapy containing bevacizumab in patients with metastatic colorectal cancer according to programmed cell death ligand 1. *World J Gastrointest Oncol* 2024; **16**: 3521-3528 [PMID: 39171162 DOI: 10.4251/wjgo.v16.i8.3521]

Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-3991568
E-mail: office@baishideng.com
Help Desk: https://www.f6publishing.com/helpdesk
https://www.wjgnet.com