

Review Article



Chemoresistance in ovarian cancer: exploiting cancer stem cell metabolism

Shan-Shan Li , Jing Ma , Alice S. T. Wong

School of Biological Sciences, The University of Hong Kong, Hong Kong, China

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Correspondence to

Alice S. T. Wong

School of Biological Sciences, Kadoorie Biological Sciences Building, The University of Hong Kong, Pok Fu Lam Road, Hong Kong 999077, China.

E-mail: awong1@hku.hk

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ORCID iDs

Shan-Shan Li

<https://orcid.org/0000-0002-4092-4879>

Jing Ma

<https://orcid.org/0000-0001-6347-8552>

Alice S. T. Wong

<https://orcid.org/0000-0002-0676-6475>

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ABSTRACT

Ovarian cancer is most deadly gynecologic malignancies worldwide. Chemotherapy is the mainstay treatment for ovarian cancer. Despite the initial response is promising, frequent recurrence in patients with advanced diseases remains a therapeutic challenge. Thus, understanding the biology of chemoresistance is of great importance to overcome this challenge and will conceivably benefit the survival of ovarian cancer patients. Although mechanisms underlying the development of chemoresistance are still ambiguous, accumulating evidence has supported an integral role of cancer stem cells (CSCs) in recurrence following chemotherapy. Recently, tumor metabolism has gained interest as a reason of chemoresistance in tumors and chemotherapeutic drugs in combination with metabolism targeting approaches has been found promising in overcoming therapeutic resistance. In this review, we will summarize recent studies on CSCs and metabolism in ovarian cancer and discuss possible role of CSCs metabolism in chemoresistance.

Keywords: Ovarian Neoplasms; Drug Resistance, Neoplasm; Cancer Stem Cells; Metabolism

BACKGROUND

Ovarian cancer is most deadly gynecologic malignancies worldwide. There were an estimated 239,000 new cases with 152,000 deaths in 2012 [1]. This high mortality is mainly due to late diagnosis with less than 20% of ovarian cancer patients are diagnosed at an early stage (International Federation of Gynecology and Obstetrics [FIGO] stage I and II). The 5-year survival rate of these patients is over 90%. However, this number is less than 30% in patients in an advanced stage (FIGO stage III and IV) as therapies become increasingly ineffective in treating metastatic ovarian cancer [2].

Most ovarian cancer patients undergo debulking surgery followed by chemotherapy. While approximately 75% of patients initially respond to the platinum/paclitaxel-based chemotherapy, most of them relapse with chemoresistance which results in treatment failure and causes over 90% of deaths [3]. Thus, understanding the molecular mechanisms underlying this drug resistance is important for the development of effective therapies to improve ovarian cancer patients' outcome.

