INPLASY

The impact of probiotics on cervical cancer prevention and treatment: a systematic review and meta-analysis

INPLASY202670043
doi: 10.37766/inplasy2026.7.0043
Received: 14 July 2026
Published: 14 July 2026

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ADMINISTRATIVE INFORMATION

Support - NA.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202670043

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 14 July 2026 and was last updated on 14 July 2026.

INTRODUCTION

Review question / Objective The aim of this study was to conduct a systematic review of research examining the effect of probiotic bacteria in the prevention and treatment of cervical cancer through a systematic review and meta-analysis of preclinical studies.

Rationale Cervical cancer remains one of the most common gynaecological malignancies worldwide. Many women continue to have persistent HPV infection and develop precancerous or cancerous lesions despite advances in vaccination and screening. Probiotics have been studied as a complementary strategy, as they appear to influence microbial protection mechanisms. Unfortunately, the available data are heterogeneous, and recommendations for their clinical application remain unclear.

The existing literature is heterogeneous, as studies differ in the populations examined, the types and doses of probiotics, the intervention protocols, and the endpoints evaluated. Some studies have shown beneficial effects, such as improved HPV clearance or a reduction in precancerous lesions, while others have reported limited or non-significant findings. At the same time, there are no clear guidelines regarding the use of probiotics in cervical cancer, making their clinical application challenging.

With that being said, there is a need for a systematic review and meta-analysis to collect and evaluate the available evidence, identify contradictions and gaps in the literature, and contribute to a clearer understanding of the effectiveness of probiotics in the prevention and treatment of cervical cancer.

Condition being studied Cervical cancer is a malignant tumour that develops from the epithelial cells of the cervix, the lower part of the uterus. It is the fourth most common cancer among women worldwide.

METHODS

Search strategy Three databases were used to perform the search: Medline, EMBASE and Web of Science. The search strategy focused on the concepts “Uterine Cervical Neoplasms” and “probiotics” along with their synonyms, combined using the Boolean operators “OR” / “AND”.

Participant or population Cervical cancer cell lines and experimental mouse models.

Intervention Cervical cancer cell lines treated with probiotics or supernatants from probiotic bacteria.

Comparator Vehicle treated cultures and vehicle treated mice.

Study designs to be included Pre-clinical studies.

Eligibility criteria Inclusion criteria: Studies evaluating the impact of probiotics or supernatants from probiotic bacteria on cervical cancer cell lines. Exclusion criteria: Reviews, editorial articles, and studies published in languages other than English.

Information sources Electronic databases: Medline, EMBASE and Web of Science.

Main outcome(s) Cell growth and viability, analysis of cell cycle progression, Caspase-3 activity, expression levels of HPV oncogenes (E6 and E7), the expression of cell-cycle related proteins (such as CDK2, cyclin A and p21), the intracellular reactive oxygen species (ROS) levels, regulation of autophagy-related genes (ATG14 and BECN1) inhibition of metastatic markers (such as MMP2 and MMP9), as well as tumour volume assessment in in vivo experimental models.

Data management Records will be kept in Mendeley and extracted data will be kept in excel.

Quality assessment / Risk of bias analysis The OHAT (Office of Health Assessment and Translation) risk of bias rating tool for in vitro studies.

Strategy of data synthesis Narrative synthesis and quantitative synthesis (meta-analysis) using Review Manager, version 5.3.

Subgroup analysis Subgroup analysis will be performed if relevant.

Sensitivity analysis Sensitivity analysis will be performed if relevant.

Language restriction English.

Country(ies) involved Cyprus.

Keywords Cervical cancer; Probiotics; Human papillomavirus (HPV); Apoptosis; E6/E7 oncogenes; systematic review; meta-analysis.

Dissemination plans Findings will be published.

Contributions of each author

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