

Using Chinese Herbal Medicine to Treat Cancer Patients: A Study Incorporating Artificial Intelligence

Robert W McGee*

Fayetteville State University, USA

*Corresponding author: Robert W McGee, Fayetteville State University, USA

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ABSTRACT

This study discusses the use of artificial intelligence (AI) to conduct research on the use of Chinese Herbal Medicine (CHM) to treat cancer patients. The author takes the reader through the necessary steps using Microsoft Copilot to create brief summaries and find relevant citations on the topic. AI provided brief descriptions of 17 herbs that can be used to treat cancer patients. The study concluded that AI can be a useful initial step in such research, but that caution must be used because the information provided may be incomplete or inaccurate. Researchers who want to obtain more detailed information about the use of Chinese herbal compounds in the treatment of cancer would need to go to PubMed or other medical databases. Much information is available. A word search for "Chinese herbal" and "cancer" received 1315 hits. Some of the studies found were cited in the last part of the article.

Keywords: Chinese Herbal Medicine; CHM; Traditional Chinese Medicine; TCM; Cancer; Copilot; Artificial Intelligence

Introduction

In recent decades some western physicians have incorporated elements of Traditional Chinese Medicine (TCM) into their medical practices. A body of English language literature is now available for reference purposes for physicians and other healthcare professionals who may not be familiar with what TCM has to offer [1-21]. TCM can be subdivided into several branches, including acupuncture, acupressure, tai chi, qigong [22-49] and herbal medicine. The present study focuses on the use of Chinese herbal medicine (CHM) in the treatment of cancer patients. For medical practitioners who may not be familiar with the use of Chinese herbal medicines, a good place to quickly learn the basics would be to do a search using artificial intelligence (AI). The use of AI for medical research has become popular in recent years [50-76] and will likely become a major medical research tool in the future, as AI becomes more sophisticated and widespread.

The Study

For medical professionals who want to learn some basics quickly and easily, a good place to start would be to do a search using AI. The present study uses Microsoft Copilot [77], which, as of this writing, is one of the more popular AI bots. The first step is to formulate a com-

mand or instruction that Copilot can use to retrieve the information needed. The instruction must not be too broad. However, for purposes of this article, we will start with a rather broad instruction so that the reader can become familiar with the basics of Chinese herbal medicine.

Instruction

Write an essay on Chinese herbal medicine. The essay should be aimed at a medical professional who is not familiar with Chinese herbal medicine and who wants to learn the basics. Include references.

The Reply

Certainly! Here's a concise essay introducing Chinese herbal medicine to medical professionals who are new to this field.

Chinese Herbal Medicine: An Introduction for Medical Professionals

Overview

Chinese herbal medicine (CHM) is an integral part of Traditional Chinese Medicine (TCM), which has evolved over thousands of years. TCM practitioners use various approaches, including acupuncture, tai

chi, and herbal products, to address health problems. In this essay, we'll focus on the basics of Chinese herbal medicine.

Key Components of Chinese Herbal Medicine

Herbal Formulas:

- CHM relies on complex herbal formulas, which combine multiple herbs to achieve specific therapeutic effects.
- These formulas are tailored to individual patients based on their unique patterns of disharmony.

Herb Selection and Preparation:

- CHM uses a vast array of plant-based materials, including roots, leaves, stems, and flowers.
- Herbs are often combined to enhance efficacy and minimize side effects.
- Traditional methods of preparation include decoctions (boiling herbs), powders, pills, and teas.

Patterns of Disharmony:

- TCM diagnoses patients based on patterns of disharmony (e.g., excess, deficiency, heat, cold).
- Herbs are selected to rebalance these patterns and restore harmony.

Effectiveness and Safety

Acupuncture:

- Acupuncture stimulates specific points on the body using thin needles.
- Research suggests that acupuncture may help manage chronic pain conditions, such as low-back pain, osteoarthritis, and migraines¹.

Tai Chi:

- Tai chi combines gentle movements, mental focus, and relaxation.
- It improves balance, reduces pain from knee osteoarthritis, and enhances quality of life¹.

Chinese Herbal Products

- Studies on Chinese herbal products have yielded mixed results due to varying quality.
- Safety concerns include contamination and manufacturing errors².

References

1. National Center for Complementary and Integrative Health (NCCIH). Traditional Chinese Medicine: What You Need To Know [78].
2. Abdelhamid, Y. (2023). What Is Traditional Chinese Medicine?[79].

Remember that while CHM has a rich history, it's essential for medical professionals to approach it with an open mind and collaborate with TCM practitioners to provide holistic care for patients.

Author Note

Notice that Copilot provided some basic information about Chinese herbal medicine but also included irrelevant information about acupuncture and tai chi. Although acupuncture and tai chi are tools in the TCM toolbox, the essay was supposed to be limited to a discussion of Chinese herbal medicine. The reason I mention this flaw is to point out the inefficiency of using AI to obtain relevant information about a specific topic. A Google search might have provided more targeted information, although perhaps not in an efficient format. AI efficiency will likely improve as AI bots become more sophisticated, but for now, researchers must be content with whatever information AI generates, which may not always be what the researcher wants. Also notice that the references it gave were incomplete. However, it did provide the references in the form of a hot link, which directs the reader to the actual publication. An examination of the Abdelhamid citation [79] found an error. The article referred to was actually published in 2022, not 2023. Now that the reader has obtained some very basic information about Chinese herbal medicine, it is time to focus on a more precise target – the use of Chinese herbal medicine to treat cancer patients. The more detailed the instruction, the better the reply is likely to be.

Instruction

How can Chinese herbal medicine (CHM) be used to treat cancer patients? Which herbs have been found to be effective? Cite some studies that have found CHM to be effective. Summarize their findings and provide citations.

Author Note

Copilot started to provide a reply, then stopped. When I asked it to continue, it continued, but omitted items 3 through 10. This kind of glitch happens sometimes, although not as frequently now as in the recent past, when ChatGPT3.5 was the leading chat bot. Researchers who experience such a glitch can overcome it by simply asking Copilot or other chat bot to either finish the essay or write a new essay. When I asked Copilot to rewrite the essay from scratch, it gave the following reply.

The Reply: I apologize for the oversight. Let's revisit the list of Chinese herbs used in cancer treatment, including items 3 to 10:

1. Curcumin

- o Derived from turmeric, curcumin has anti-proliferative and pro-apoptotic effects.
- o Clinical studies are limited, but it shows promise.

2. Epigallocatechin gallate (EGCG)

- o Found in green tea, EGCG targets the laminin receptor and has potential in treating prostate cancer.

3. Berberine

- o Derived from various plants, berberine exhibits anti-cancer properties.
- o Its effects on cancer immunity need further investigation.

4. Artemisinin

- o Derived from sweet wormwood (*Artemisia annua*), artemisinin has anti-proliferative and anti-metastatic effects.
- o It's used in combination therapies for cancer treatment.

5. Ginsenoside Rg3

- o Ginseng-derived ginsenoside Rg3 inhibits P-glycoprotein activity, reversing multidrug resistance in cancer cells.

6. Ursolic Acid

- o Found in various herbs, ursolic acid has anti-cancer effects.
- o Its clinical applications are still under investigation.

7. Silibinin

- o Derived from milk thistle, silibinin shows anti-angiogenic effects.
- o Research continues to explore its potential in cancer therapy.

8. Emodin

- o Emodin, from rhubarb, exhibits anti-proliferative effects.
- o Its clinical applications require further study.

9. Triptolide

- o Derived from thunder god vine, triptolide has anti-cancer properties.
- o Its mechanism of action and clinical applications are being investigated.

10. Cucurbitacin B

- o Found in various cucurbitaceous plants, cucurbitacin B has anti-cancer effects.

- o Its potential in combined therapy needs exploration.

11. Tripterygium wilfordii Hook F (TwHF)

- o Also known as "lei gong teng," TwHF has been used in CHM for centuries.
- o Triptolide, an active compound in TwHF, exhibits anti-inflammatory and anti-cancer effects.
- o Studies suggest its potential in treating various cancers, including pancreatic, liver, and breast cancer.

12. Astragalus Membranaceus (Huang Qi)

- o Huang Qi is an immune-modulating herb.
- o It enhances immune function and reduces chemotherapy-induced side effects.
- o Clinical trials show improved quality of life and prolonged survival in cancer patients.

13. Ganoderma lucidum (Lingzhi/Reishi)

- o Lingzhi is a medicinal mushroom with immunomodulatory properties.
- o It enhances immune responses and may inhibit tumor growth.
- o Research supports its use as an adjunctive therapy in cancer management.

14. Oldenlandia diffusa (Bai Hua She She Cao)

- o Bai Hua She She Cao has anti-cancer effects.
- o Studies indicate its potential in treating lung, liver, and breast cancer.

15. Sophora flavescens (Ku Shen)

- o Ku Shen contains matrine and oxymatrine, which exhibit anti-cancer properties.
- o Research suggests their efficacy against leukemia, liver cancer, and gastric cancer.

16. Salvia miltiorrhiza (Dan Shen)

- o Dan Shen improves microcirculation and reduces oxidative stress.
- o It may enhance the effectiveness of chemotherapy and radiation therapy.

17. Polygonum cuspidatum (Hu Zhang)

- o Hu Zhang contains resveratrol, known for its anti-cancer effects.
- o Studies highlight its potential in breast, prostate, and colorectal cancer.

Remember that while these herbs show promise, individual responses can vary. Always consult with a qualified healthcare professional before integrating CHM into cancer treatment. For a comprehensive understanding, refer to the review by Luo et al. (2019).

Author Note

This reply was much better than the first reply, which gave some irrelevant information about acupuncture and tai chi. It cited two references [80-81]. The second one [81] was incomplete, but better than nothing. The information given provides a good starting point for further research. It should be pointed out that medical professionals need to verify the accuracy of the information just provided, since prior studies have found that AI can sometimes give information that is inaccurate [82]. AI can be used as a starting point for medical (and other) research, but it should not be the only research that is done, since its results need to be verified.

One can dig deeper into the subject by asking additional questions. For example,

Instruction

How do Chinese herbal compounds affect cancer cells? Write a brief essay and provide references.

Reply

Certainly! Chinese herbal medicine has a long history of use in cancer treatment. Numerous natural compounds derived from these herbs exhibit anti-cancer effects. Let's delve into some key points:

1. Anti-Cancer Compounds from Chinese Herbal Medicine
 - o Curcumin: Derived from turmeric, curcumin has anti-proliferative and pro-apoptotic effects. It induces autophagy and enhances apoptotic cell death [83].
 - o Epigallocatechin gallate (EGCG): Found in green tea, EGCG targets receptors and shows efficacy in treating prostate cancer [83].
 - o Berberine: Extracted from various plants, berberine has anti-inflammatory and anti-cancer properties.
 - o Artemisinin: Derived from sweet wormwood, artemisinin exhibits anti-metastatic and anti-angiogenic effects.
 - o Ginsenoside Rg3: Ginseng-derived compound that inhibits P-glycoprotein activity, reversing multidrug resistance [83].
 - o Ursolic acid, Silibinin, Emodin, and others also contribute to anti-cancer effects.

2. Mechanisms of Action

- o These compounds regulate autophagy, enhance chemotherapy, and balance immunity.
- o Some directly target cancer cells, while others modulate the tumor microenvironment.
- o EGCG, for instance, inhibits Laminin receptor (Lam 67R), impacting cancer cell growth [83].

3. Clinical Studies and Immunomodulation:

- o Evidence on immunomodulatory effects and clinical trials of these compounds is limited.
- o Further research is needed to explore their mechanisms as immune checkpoint modulators [83].

4. References

- o Luo, H., Vong, C. T., Chen, H., Gao, Y., Lyu, P., Qiu, L., ... & Wang, Y. (2019). Naturally occurring anti-cancer compounds: shining from Chinese herbal medicine. *Chinese Medicine*, 14, 48 [83]
- o Read the full article here.

In summary, Chinese herbal compounds offer promising avenues for cancer therapy, but further research is essential to unlock their full potential.

Author Note

The response was good, although brief. There was also some repetition with the prior replies.

Instruction

What role does Chinese herbal medicine play in cancer palliative care? Write a brief essay and provide references.

Reply

Certainly! Chinese herbal medicine (CHM) has gained attention as a complementary approach in cancer palliative care. Let's explore its role:

1. Symptom Management

- o CHM is commonly used to alleviate cancer-related symptoms such as pain, fatigue, nausea, and insomnia.
- o Herbal formulations can improve quality of life by addressing physical and emotional distress.

2. Quality of Life Enhancement

- o CHM may enhance overall well-being, reduce anxiety, and promote relaxation.
- o Patients often report improved energy levels and better emotional balance.

3. Safety and Adverse Effects

- o Studies show that CHM is generally safe, with minimal adverse effects.
- o It can be a valuable option for patients seeking holistic care.

4. Survival and Toxicity

- o Evidence on CHM's impact on survival is inconclusive.
- o Some studies suggest potential benefits, but more research is needed.
- o CHM may help reduce chemotherapy and radiotherapy-related toxicities.

5. References

- o Chung, V. C., Wu, X., Hui, E. P., Ziea, E. T., Ng, B. F., Ho, R. S., ... & Wu, J. C. (2015). Effectiveness of Chinese herbal medicine for cancer palliative care: overview of systematic reviews with meta-analyses. *Scientific Reports*, 5, 18111[84].
- o Read the full article here.

In summary, CHM can contribute to symptom relief and improved quality of life in cancer patients receiving palliative care. However, its impact on survival remains uncertain.

Author Note

Again, the reply was brief, but provided some useful information, which can be used as the basis for further research.

Instruction

What are the limitations and potential risks of using Chinese herbal compounds to treat cancer patients? Write a brief essay and provide references.

Reply

Certainly! Chinese herbal medicine (CHM) has gained attention as a complementary approach in cancer treatment. However, it's essential to consider both the potential benefits and limitations:

1. Lack of Standardization

- o CHM formulations vary widely, making it challenging to standardize dosages and quality.
- o Inconsistent potency and purity can affect efficacy and safety.

2. Herb-Drug Interactions

- o CHM may interact with conventional cancer drugs, affecting their effectiveness.
- o Patients should inform their oncologists about CHM use to prevent adverse interactions[85].

3. Limited Clinical Evidence

- o While some studies show positive effects, robust clinical evidence is lacking.
- o Rigorous randomized controlled trials are needed to validate CHM's efficacy.

4. Risk of Toxicity

- o Certain herbs may have toxic components or contaminants.
- o Long-term use without supervision can lead to adverse effects.

5. Patient Variability

- o Responses to CHM vary among individuals due to genetic factors.
- o Personalized approaches are crucial for optimal outcomes.

6. References

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- o Cochrane. (n.d.). Chinese medicinal herbs for the treatment of side-effects from chemotherapy in breast cancer patients [86].

In summary, while CHM shows promise, cautious integration with conventional treatments and close monitoring are essential to mitigate risks.

Author Note

Again, the information given was brief but to the point. The second reference given [86] was inaccurate but useful. It listed Cochrane with no date, but actually, if one follows the link provided, the actual authors, date and complete citation are available.

Concluding Comments

This study shows that artificial intelligence can be used to generate useful information about the possible applications of Chinese herbal compounds to treat cancer patients. It also shows that the information obtained might be superficial, incomplete and perhaps inaccurate at times. Thus, the use of artificial intelligence to conduct research on cancer, and perhaps thousands of other topics, can be the first step in a research project, but should not be the last. The information obtained must be verified for accuracy and completeness. If further research needs to be done of a particular medical topic, and to place to obtain more detailed information would be the PubMed website [87]. This website is one of several excellent sources of information on a wide range of medical issues and studies. A search of "Chinese herbal" and "cancer" received 1,315 hits. Thus, much more information is available on this topic [88-114]. Some studies examining the use of CHM on cancer therapy include the regulation of immunity [89], gastric cancer [92, 95, 109-110], liver cancer [93],

chemoprevention and therapy [94], oesophageal cancer [96], cervical cancer [97], oral cancer [98], hepatocellular carcinoma [99-100, 113], lung cancer [101], prostate cancer [102], colorectal cancer [103, 112], symptom management in palliative care [104], pancreatic cancer [105], cancer related fatigue [106], reactive oxygen species [107], breast cancer [108, 114], and chemotherapy-induced nausea and vomiting [111], to name a few.

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