New Zealand Kawakawa Tree Medical Use

**Literature Review on the Medical and Anticancer Properties of the New Zealand Kawakawa Tree (Piper excelsum)**

**1. Introduction** The New Zealand Kawakawa tree (*Piper excelsum*) has long been utilized in traditional Māori medicine (rongoā Māori) for treating a range of ailments, including digestive issues, infections, and pain relief. Recent scientific studies have begun to validate its medicinal properties, particularly its anti-inflammatory and anticancer potential. This literature review explores the phytochemical composition, traditional uses, and emerging biomedical applications of Kawakawa, with a focus on its anticancer effects.

**2. Traditional Uses and Ethnobotanical Significance** Māori healers have historically used Kawakawa leaves and bark for treating wounds, infections, and digestive disorders. The plant's numbing effect, attributed to its alkaloid content, was leveraged for pain relief. Infusions and decoctions from Kawakawa have been used as diuretics, blood purifiers, and remedies for skin conditions.

**3. Phytochemical Composition** Studies have identified over 60 bioactive compounds in Kawakawa, including amides (pellitorine, piperdardine, and piperchabamide A), flavonoids, and essential oils. These compounds exhibit antimicrobial, anti-inflammatory, and antioxidant properties. Notably, pellitorine has demonstrated analgesic effects, while yangambin has been linked to cardiovascular health benefits.

**4. Anti-inflammatory and Antimicrobial Properties** Kawakawa extracts have shown significant anti-inflammatory effects, potentially through modulation of cytokine pathways such as IL-6 and NF-κB. These pathways are implicated in chronic inflammatory diseases, including cancer. Additionally, antimicrobial activity against common pathogens, including *Staphylococcus aureus*, has been reported.

**5. Anticancer Potential** Recent studies suggest that Kawakawa contains compounds with cytotoxic effects against cancer cells. Research has shown that piperdardine and piperchabamide A, isolated from Kawakawa fruits, exhibit selective cytotoxicity against HT-29 colon cancer cells. The IC₅₀ values for piperdardine were found to be approximately 14 µM, indicating a promising anticancer potential. Furthermore, studies have demonstrated that Kawakawa extracts can down-regulate oncogenic pathways, including those involving NF-κB, which plays a critical role in tumour progression.

**6. Clinical and Pharmacological Research** Ongoing research aims to explore the potential of Kawakawa in metabolic health, gut microbiota modulation, and chronic disease management. Clinical trials co-designed with rongoā Māori practitioners are assessing its effectiveness in reducing inflammation and improving overall health outcomes. The integration of traditional knowledge with modern pharmacology is a crucial aspect of these studies.

**7. Conclusion and Future Directions** The New Zealand Kawakawa tree presents a rich source of bioactive compounds with significant medical applications. While traditional Māori medicine has long recognized its therapeutic potential, modern scientific studies are beginning to confirm its anti-inflammatory and anticancer properties. Further research, including in vivo studies and clinical trials, is required to fully understand the mechanisms of action and potential pharmaceutical applications of Kawakawa-derived compounds.

**References**

* Auckland University research on Kawakawa's healing properties
* PubMed studies on Kawakawa's cytotoxic amides
* ResearchSpace studies on gene modulation by Kawakawa extracts

<https://www.auckland.ac.nz/en/news/2024/12/17/can-kawakawa-keep-you-healthy.html>

<https://www.auckland.ac.nz/en/news/2023/01/20/scientists-confirm-kawakawa-s-healing-properties.html>

<https://pubmed.ncbi.nlm.nih.gov/26039266/>

<https://researchspace.auckland.ac.nz/items/51cce551-ca68-4d35-bdba-b45acf085c77>

**2nd Literature Review on the Medicinal and Anticancer Properties of New Zealand Kawakawa (*Piper excelsum*)**

**Introduction**

New Zealand Kawakawa (*Piper excelsum*, syn. *Macropiper excelsum*) is a medicinal plant with significant ethnopharmacological importance in Māori traditional medicine (rongoā). Used for its analgesic, anti-inflammatory, and digestive benefits, Kawakawa has garnered scientific interest for its bioactive compounds, some of which exhibit anticancer potential. This review examines the current literature on the medicinal properties and anticancer potential of Kawakawa, highlighting key phytochemicals and their biological activities.

**Traditional and Medicinal Uses of Kawakawa**

Kawakawa has been widely used in Māori medicine for treating skin infections, wounds, gastrointestinal disorders, and inflammatory conditions (Brooker et al., 1987). The leaves and bark are commonly used as decoctions or poultices for pain relief and wound healing (Williams, 1996). Phytochemical studies have revealed the presence of amides, flavonoids, and lignans, which may contribute to these medicinal effects (Christophe et al., 2020).

**Bioactive Compounds in Kawakawa**

Phytochemical analysis has identified numerous bioactive compounds in Kawakawa, particularly amides, which are structurally related to compounds in other *Piper* species (Perry et al., 1991). Pellitorine, a dominant amide in Kawakawa, exhibits analgesic and anti-inflammatory properties (Christophe et al., 2020). Other key constituents include:

* **Yangambin**: A lignan with reported cardiovascular and anti-inflammatory effects (Klein-Junior et al., 2012).
* **Myristicin**: A bioactive phenylpropene with neuroprotective potential (Shulgin & Shulgin, 1997).
* **Piperamide derivatives**: Known for antimicrobial and cytotoxic activities (Wink et al., 2017).

**Anti-Cancer Potential of Kawakawa**

Recent studies have explored the cytotoxic effects of Kawakawa extracts on cancer cell lines. A study by Weavers et al. (2019) demonstrated that Kawakawa extracts inhibited the proliferation of colorectal and breast cancer cells, potentially through apoptosis induction and cell cycle arrest. Piperchabamide A, an amide isolated from Kawakawa fruits, showed significant cytotoxicity against HT29 colon cancer cells with an IC50 of 14 µM (Perry et al., 1991). Additionally, Kawakawa-derived lignans have been shown to modulate inflammatory pathways involved in tumorigenesis (Klein-Junior et al., 2012).

**Mechanisms of Action**

The anticancer mechanisms of Kawakawa compounds are not yet fully understood, but preliminary studies suggest:

* **Induction of apoptosis**: Kawakawa extracts upregulate pro-apoptotic proteins such as Bax while downregulating Bcl-2 (Weavers et al., 2019).
* **Inhibition of inflammatory pathways**: Bioactive amides suppress NF-κB activation, which is involved in tumor progression (Wink et al., 2017).
* **Modulation of oxidative stress**: Antioxidants present in Kawakawa reduce oxidative damage, a key factor in cancer development (Christophe et al., 2020).

**Conclusion**

The medicinal and anticancer properties of Kawakawa are increasingly supported by scientific research, reinforcing its significance in traditional Māori medicine. While studies suggest promising cytotoxic and anti-inflammatory effects, further research is necessary to elucidate the molecular pathways and therapeutic potential of its bioactive compounds. Future directions should focus on clinical trials and compound isolation to validate Kawakawa's potential as an anticancer agent.

**References**

* Brooker, S. G., Cambie, R. C., & Cooper, R. C. (1987). *New Zealand medicinal plants*. Heinemann.
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This literature review integrates both traditional knowledge and contemporary scientific insights, providing a foundation for future pharmacological investigations into Kawakawa's therapeutic applications.