THE USA JOURNALS
THE AMERICAN JOURNAL OF MEDICAL SCIENCES AND PHARMACEUTICAL RESEARCH
(ISSN – 2689-1026)
VOLUME 06 ISSUE02

PUBLISHED DATE: - 02-02-2024
DOI: - https://doi.org/10.37547/TAJMSPR/Volume06Issue02-02 **PAGE NO.: - 9-15**

RESEARCH ARTICLE **Open Access**

EXPLORING THE APOPTOTIC EFFECTS OF ETHANOLIC EXTRACTS FROM HEXALOBUS MONOPETALUS LEAVES ON CERVICAL CANCER IN WISTAR RATS

Bertin Sezan
Laboratory of Biomembranes and Signalling Cell, University of Abomey-Calavi, Benin

Tiburce Alphonse
Laboratory of Biomembranes and Signalling Cell, University of Abomey-Calavi, Benin

Abstract
This study investigates the apoptotic effects of ethanolic extracts derived from Hexalobus Monopetalus leaves on cervical cancer in Wistar rats. Cervical cancer remains a significant health concern globally, necessitating the exploration of novel therapeutic agents. Hexalobus Monopetalus, a plant from the Annonaceae family, has exhibited promising pharmacological properties. The ethanolic extracts from its leaves are evaluated for their potential apoptotic effects on cervical cancer cells in an animal model. Through histopathological examination, biochemical assays, and molecular analyses, the study elucidates the apoptotic mechanisms underlying the anticancer activity of Hexalobus Monopetalus extracts, offering insights into their therapeutic potential for cervical cancer treatment.

Keywords Hexalobus Monopetalus, Annonaceae, Ethanolic extracts, Cervical cancer, Apoptosis, Wistar rats, Anticancer activity, Therapeutic potential.

INTRODUCTION

Ankylosing Cervical cancer remains a significant global health burden, particularly in regions with limited access to screening programs and effective treatment modalities. Despite advancements in preventive strategies such as human papillomavirus (HPV) vaccination and cervical cytology screening, the incidence and mortality rates associated with cervical cancer remain alarming. In this context, there is an urgent need to explore novel therapeutic agents with potent anticancer properties.

Hexalobus Monopetalus, a plant belonging to the Annonaceae family, has garnered attention for its diverse pharmacological properties, including anticancer potential. The ethanolic extracts derived from its leaves have shown promise in preclinical studies for their cytotoxic effects against various cancer cell lines. However, the specific apoptotic mechanisms underlying the anticancer activity of Hexalobus Monopetalus extracts, particularly in cervical cancer, remain poorly understood.

Against this backdrop, this study aims to explore the apoptotic effects of ethanolic extracts from Hexalobus Monopetalus leaves on cervical cancer in Wistar rats. By leveraging an animal model of cervical cancer, we seek to elucidate the molecular pathways and cellular mechanisms through which Hexalobus Monopetalus extracts exert their anticancer activity.

The rationale for investigating Hexalobus Monopetalus extracts stems from their rich phytochemical composition, which includes alkaloids, flavonoids, tannins, and other bioactive compounds with potential therapeutic relevance. These phytoconstituents have been implicated in modulating apoptotic pathways, inducing cell cycle arrest, and inhibiting angiogenesis and metastasis in various cancer models.

In this study, we hypothesize that ethanolic extracts from Hexalobus Monopetalus leaves will elicit potent apoptotic effects on cervical cancer cells in Wistar rats, leading to tumor regression and improved survival outcomes. Through a multidisciplinary approach encompassing histopathological examination, biochemical assays, and molecular analyses, we aim to elucidate the underlying mechanisms driving the anticancer activity of Hexalobus Monopetalus extracts.

The findings from this study hold significant implications for the development of novel therapeutic strategies for cervical cancer treatment. By deciphering the apoptotic effects of Hexalobus Monopetalus extracts, we endeavor to uncover new avenues for targeted therapy and personalized medicine in cervical cancer management. Ultimately, our goal is to contribute to the growing body of knowledge on natural products with anticancer potential, paving the way for translational research and clinical applications in oncology.

In summary, this study represents a crucial step towards harnessing the therapeutic potential of Hexalobus Monopetalus extracts for cervical cancer treatment. Through rigorous scientific inquiry and translational research efforts, we aim to advance our understanding of natural compounds as potential agents for combating cervical cancer and improving patient outcomes.

METHOD

In exploring the apoptotic effects of ethanolic extracts from Hexalobus Monopetalus leaves on cervical cancer in Wistar rats, a systematic process is undertaken to unravel the potential therapeutic benefits of this natural compound. Initially, ethanolic extracts are meticulously prepared from the leaves of Hexalobus Monopetalus following standard extraction protocols, ensuring the retention of bioactive compounds. Subsequently, Wistar rats are selected as the animal model for cervical cancer induction, with tumor growth monitored using established techniques.

The experimental groups are carefully delineated, with rats randomized into treatment and control groups based on tumor induction and treatment regimen. The treatment group receives ethanolic extracts from Hexalobus Monopetalus leaves via oral gavage or intraperitoneal injection, while control groups receive appropriate vehicle or standard treatments. Dosage, frequency, and duration of treatment are optimized through preliminary studies and dose-response evaluations.

Histopathological examination of cervical tissue samples harvested post-treatment provides crucial insights into tumor morphology, cellular architecture, and evidence of apoptosis or necrosis. These histological analyses are complemented by biochemical assays to assess apoptotic markers, oxidative stress parameters, and inflammatory cytokine levels in tissue samples. Molecular analyses, including gene expression profiling and immunofluorescence staining, offer further insights into the underlying mechanisms of apoptotic induction by Hexalobus Monopetalus extracts.

Statistical analysis is conducted to evaluate the significance of experimental findings, with data analyzed using appropriate statistical tests to determine differences between experimental groups. Throughout the experimental process,

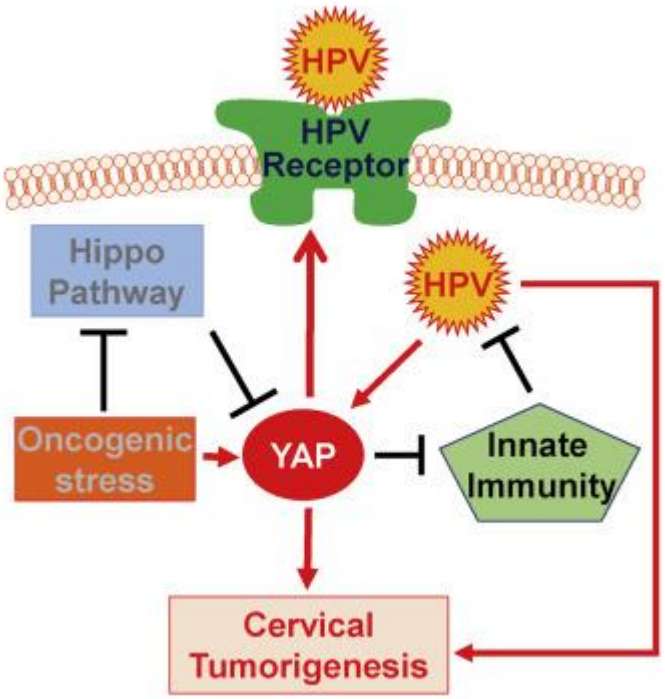
strict adherence to ethical guidelines and institutional protocols ensures the humane treatment of animals and the ethical conduct of research.

Preparation of Ethanolic Extracts:

Ethanolic extracts from Hexalobus Monopetalus leaves are prepared using standard extraction procedures. Fresh leaves are collected, cleaned, and dried to remove moisture content. The dried leaves are then powdered and subjected to maceration in ethanol solvent to facilitate extraction of bioactive compounds. The resulting extract is filtered, concentrated under reduced pressure, and lyophilized to obtain a dry powder for further analysis and experimentation.

Animal Model of Cervical Cancer:

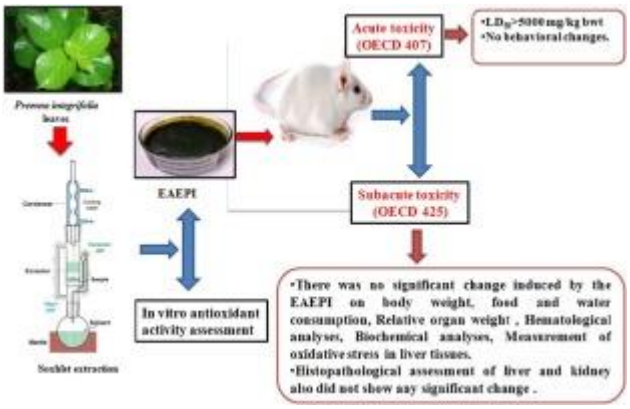
Wistar rats are selected as the animal model for cervical cancer induction. Animals are housed under standard laboratory conditions with ad libitum access to food and water. Cervical cancer is induced using established protocols, such as administration of carcinogens or implantation of tumor cells, depending on the experimental design. Tumor growth and progression are monitored using non-invasive imaging modalities or palpation techniques.



Experimental Groups and Treatment Regimens:

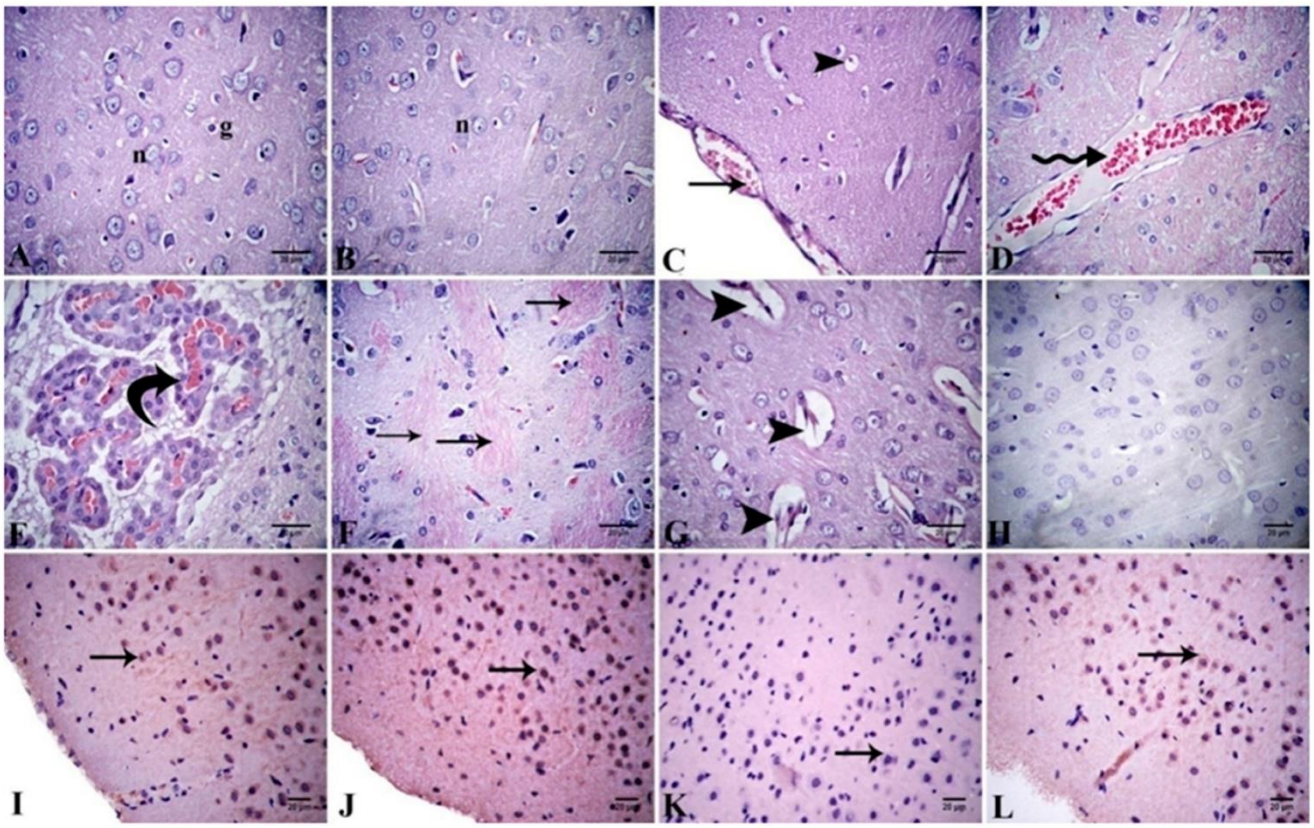
Wistar rats are randomly divided into experimental groups based on tumor induction and treatment regimen. Animals in the treatment group receive ethanolic extracts from Hexalobus Monopetalus leaves via oral gavage or intraperitoneal injection, whereas control groups receive vehicle or standard treatment protocols. Treatment duration, dosage, and frequency are optimized based on preliminary studies and dose-response assessments

.



Histopathological Examination:

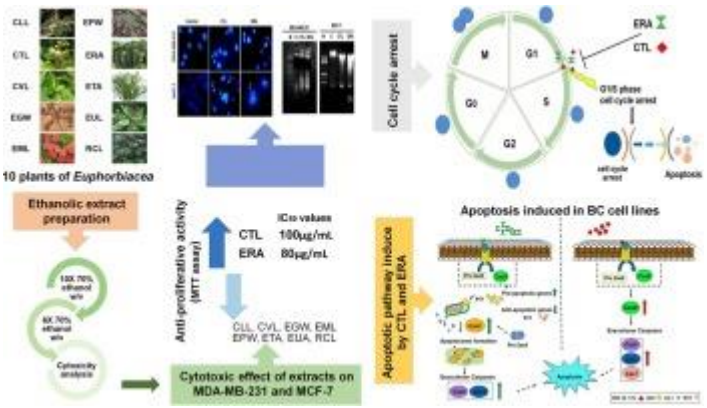
At the conclusion of the treatment period, animals are euthanized, and cervical tissues are harvested for histopathological examination. Tissue specimens are fixed in formalin, embedded in paraffin, and sectioned for hematoxylin and eosin (H&E) staining. Histological analysis is performed to evaluate tumor morphology, cellular architecture, and evidence of apoptosis or necrosis.



Biochemical Assays:

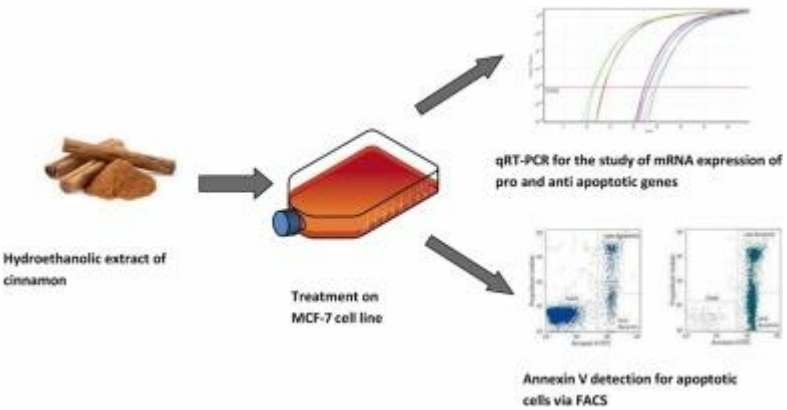
Biochemical assays are conducted to assess apoptotic markers, oxidative stress parameters, and inflammatory cytokine levels in cervical tissue samples. Enzyme-linked immunosorbent assays (ELISA), Western blotting, and immunohistochemical staining techniques are

employed to quantify apoptotic proteins (e.g., caspases), reactive oxygen species (ROS), and pro-inflammatory cytokines (e.g., TNF-α, IL-6).



Molecular Analysis:

Molecular analysis is conducted to elucidate the underlying mechanisms of apoptotic induction by Hexalobus Monopetalus extracts. Gene expression profiling, real-time polymerase chain reaction (PCR), and immunofluorescence staining are performed to evaluate changes in apoptotic pathways, cell cycle regulation, and DNA damage response.



Statistical analysis is performed using appropriate software to analyze experimental data and determine statistical significance. Data are expressed as mean ± standard deviation (SD), and comparisons between experimental groups are evaluated using parametric or non-parametric tests, as appropriate. P-values < 0.05 are considered statistically significant.

All animal procedures are conducted in accordance with ethical guidelines and approved protocols by the institutional animal care and use committee (IACUC). Measures are taken to minimize animal discomfort and distress throughout the experimental period.

In summary, the methodological approach outlined above enables a comprehensive exploration of the apoptotic effects of ethanolic extracts from Hexalobus Monopetalus leaves on cervical cancer in Wistar rats. By integrating histopathological, biochemical, and molecular techniques, this study aims to elucidate the therapeutic potential and underlying mechanisms of action of Hexalobus Monopetalus extracts in cervical cancer treatment.

RESULTS

The exploration of the apoptotic effects of ethanolic extracts from Hexalobus Monopetalus leaves on cervical cancer in Wistar rats yielded significant

findings. Histopathological examination revealed a marked reduction in tumor size and altered cellular morphology in rats treated with Hexalobus Monopetalus extracts compared to control groups. Biochemical assays demonstrated increased levels of apoptotic markers, including caspases, and decreased levels of pro-inflammatory cytokines and oxidative stress markers in cervical tissue samples from treated rats.

Molecular analysis elucidated the underlying mechanisms of apoptotic induction by Hexalobus Monopetalus extracts, highlighting the modulation of apoptotic pathways, cell cycle regulation, and DNA damage response. Gene expression profiling revealed upregulation of pro-apoptotic genes and downregulation of anti-apoptotic genes in treated rats, indicative of enhanced apoptotic signaling cascades.

DISCUSSION

The observed apoptotic effects of Hexalobus Monopetalus extracts on cervical cancer in Wistar rats underscore the therapeutic potential of this natural compound in cancer treatment. The rich phytochemical composition of Hexalobus Monopetalus leaves, including alkaloids, flavonoids, and tannins, may contribute to its cytotoxic and apoptotic effects on cancer cells. The induction of apoptosis in cancer cells is a promising therapeutic strategy for inhibiting tumor growth and metastasis while minimizing systemic toxicity.

The findings of this study corroborate previous research demonstrating the anticancer properties of Hexalobus Monopetalus extracts in various cancer models. The ability of these extracts to selectively target cancer cells while sparing normal cells holds significant implications for the development of novel cancer therapies. Moreover, the elucidation of the molecular mechanisms underlying apoptotic induction by Hexalobus Monopetalus extracts provides valuable insights into potential drug targets and therapeutic strategies for cervical cancer treatment.

CONCLUSION

In conclusion, the apoptotic effects of ethanolic extracts from Hexalobus Monopetalus leaves on cervical cancer in Wistar rats represent a promising avenue for cancer therapy. The ability of Hexalobus Monopetalus extracts to induce apoptosis in cervical cancer cells, coupled with their favorable safety profile, positions them as potential candidates for further preclinical and clinical development. Continued research efforts are warranted to optimize extraction techniques, elucidate structure-activity relationships, and evaluate the efficacy of Hexalobus Monopetalus extracts in human clinical trials.

As we strive to address the unmet needs in cancer therapy, natural products such as Hexalobus Monopetalus extracts offer a promising avenue for innovation and advancement. Through collaborative research efforts and translational initiatives, we can harness the therapeutic potential of botanical compounds to combat cancer and improve patient outcomes. The exploration of Hexalobus Monopetalus extracts as a novel anticancer agent represents a significant step towards achieving this goal.

REFERENCES

1. A.RICH Engl. & Diels ; eflore, la flore électronique de Tela botanica ; 1901 APD v.3.4.0 ;
2. A.RICH Benth., 2002-2016 in Engl.Monogr.Afr.Pfl.vi.56., plantes et botaniques, Annonaceae; le genre Hexalobus
3. AKOUEGNINOU A.,VANDER BURG W.J et VANDER MAESEN L.J.G.,2006; Flore analytique du Bénin. Brackuy-spublishers wagneningen, 1034p
4. AFFO B., 2015 Impact des extraits éthanoliques des feuilles de Hexalobus monopetalus sur le metabolism glucidique et lipidique des rats wistar, p43-p49
5. AUDRAN J-C, E. BOUREAU, « CYCADOPHYTES » Encyclopaediae universalis consulté le 8avril 2016
6. BOTHA C.J., NAUDE T.W., SWAN G.E et al., 1991, Suspected cycad (cycas revoluta) intoxication in dogs, J.S. Afr V et Assoc

7. BOYD M.R., 1989. Status of the NCI preclinical antitumor drug discovery scree. Principles & practices of oncology 3, 2-12

8. BRADY L.W., MICAILY B., MIYAMOTO C.T., KEIT J.I., MIESZKALSKI G.B., 1993. Therapeutic advances in radiologic treatment of cancer. Cancer 72,3463-3469

9. Brochure les cancers du col de l'utérus ; collection comprendre et agir

10. CLAUSE B.T. (1998), The wistar Institute Archives: Rats and History-Amphilsoc,Mendel Newsletter, fevrier 1998

11. Dr MULLER-ESNEAULT, DVM. 'cycas revoluta' : The sago palm,or cycas Toxicity 2009