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REVIEW:
WASPS VENOM NEW TREND FOR TREATMENT OF CANCER, MICROBIAL AND PATHOGENIC DISEASES



Abstract:

Cancer is one of the main causes of death worldwide. For experts, epidemiological trends continue to be alarming given the increases in the rates of incidence and mortality. Nowadays, tumors are treated with radiotherapy, surgery and chemotherapy. The side effects derived from anti-tumor compounds are a result of their low specificity. On the other hand Parasitic and pathogenic diseases are relentlessly progressive, affected all living organisms. Wasp venom may deliver a painful sting, but scientists have carried out successful in vitro tests using the Wasps venom to kill cancer cells and antimicrobial diseases. Scientists designed a new therapy based on a peptide - the binding of several amino acids peptides from wasp venom for its potential use against breast cancer. This peptide has the ability to form pores in the cell plasma membrane, penetrate into the cell and finally, cause its death. Wasp Venom has long been used in traditional medicine. The active components of Wasp Venom found to exhibit interesting bioactivities, such as antimicrobial, anti-inflammatory and antioxidant activities as well as anti-tumors. In this respect, the present review for understanding of the mechanisms, mode of action and future prospects regarding the use of new drugs derived from wasp venom for treatment cancer, microbial and pathogenic diseases.

Keywords: Cancer diseases; Wasps Venom, Drugs, Antimicrobial, Anti-pathogenic effect

Wasp Venom as Anti- cancer a challenge for scientists

- Wasps can be a menace, often found haunting picnics and fruit trees in the summer. However, the venom of one particular breed of wasp is known to contain a potent anticancer ingredient, and now researchers have shown precisely how the venom's toxin selectively kills cancer cells.
- Cancer is one of the main causes of death worldwide. For experts, epidemiological trends continue to be alarming given the increases in the rates of incidence and mortality. Nowadays, tumours are treated with radiotherapy, surgery and chemotherapy. The side effects derived from anti-tumour compounds are a result of their low specificity.

Wasp Venom Targets Breast Cancer in New Therapy

- Wasp venom may deliver a painful sting, but scientists from the Institute for Biomedical Research (IRB Barcelona) have carried out successful in vitro tests using the venom to kill breast cancer tumor cells, a new study describes. The next step will be to test its effectiveness in mouse models.
- Most anti-tumor compounds are accompanied by a series of side effects and may even become resistant, but the IRB Barcelona team designed a new therapy based on a peptide - the binding of several amino acids - from wasp venom for its potential use against breast cancer.
- This peptide has the ability to form pores in the cell plasma membrane, penetrate into the cell and finally, cause its death, either by necrosis or by triggering apoptosis, programmed cell death. However, this "natural weapon" could not be directly used in the therapy due to its high toxicity and lack of cell specificity - meaning, it would not only attack tumor cells but healthy cells as well. So, the researchers came up with a way to deliver the venom to the tumor without causing harm to the body's healthy cells.
- The system consists of a decorated carrier polymer with two components: a peptide that is bound to a tumor cell receptor and the cytotoxic peptide of the wasp venom.
- In vitro experiments show that the substance successfully reaches and kills the tumor cells while leaving healthy cells, like red blood cells, alone.

EGYPTIAN WASPS VENOM

VESPA ORIANTALIS

- Venom belonging to the Egyptian social wasp *Vespa oriantalis* contains the antimicrobial peptide Polybia-MP1 (MP1), which has been demonstrated to inhibit multiple forms of cancerous cells such as prostate cancer, bladder **cancer** and multidrug-resistant leukemic cells.
- Despite this antimicrobial peptide showing great potential as a component of anticancer treatment in humans, researchers have not fully understood exactly how MP1 kills cancer cells.

BIOACTIVE PEPTIDES OF WASP VENOM

Purified peptide from wasp venom named Vespin, was subjected to amino acid sequence analysis . Vespin is composed of 44 amino acid residues and this peptide is characterized by a single half-cysteine. These peptides are bradykinin-like peptides, chemotactic peptides and mastoparans. These major bioactive peptides as antimicrobial effects and inflammation induction by lysing cell membrane or stimulating mast cell degranulation, histamine release and consequent vasodilatation, and increasing neutrophils and T helper cells chemotaxis. All of these effects are related with cardiovascular system, nervous system and immunological system of mammals, including humans.

CONCLUSION

Vespa oriantalis wasp possesses highly toxic venom, which is rich in toxin, enzymes and biologically active peptides for Cancer therapy. Many bioactive substances were identified from wasp venom. The primary structures of these peptides are homologous to those of chemotactic peptides and mastoparans isolated from other vespid venoms. These peptides show antimicrobial activities against bacteria and fungi. Also they show antitumor of mice cancer cells and hemolytic activity against human blood red cells.

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Thank you
Best Regards