

## Surface modification of nematode and cancer therapy

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### Introductio

Herring worm or *Anisakis simplex* is a nematode parasite belongs to family Anisakidae. It is a zoonotic parasite of marine creatures and humans have chance of acquiring infection or allergic effects brought about by utilization of crude or uncooked fish containing larval stages of nematode. *Anisakis* is responsible for majority of allergies to sea food. This parasite basically causes disease of stomach and digestive system hence bringing about side effects like stomach cramps, sickness vomition and loose bowels. If not treated early it may develop into chronic infection that cause dull stomach aches and indigestion. As of late the parasite has acquired consideration in view of revelation of its expected role in cancer chemotherapy. Surface modification of parasite can form it into potential medication conveyance specialist in malignant growth treatment.

### Affinity for cancer cells

There are many case reports that shows the relationship of *Anisakis* larve or grown-up worm with malignant cells. Evidences of its relation with early gastric cancer and chronic colon cancer are there that suggest that its presence at these sites can't be mere incidental. Research has demonstrated that parasite have unique affinity for malignant cells and can identify cancer cells chemically and join them. Its disease can cause gastric polyps which histopathologically are eosinophill-infiltrated polyadenomas (precancerous lesions). Studies likewise propose that disease of *Anisakis* could be a potential risk factor for creating stomach malignant growth.

### Genetically engineered *Anisakis*

Structural and functional changes in membrane of parasite with hydrogel sheath can provide new functions to the nematode. Scientists have developed an in situ cross-linking technique

to modify surface membrane of nematode by creating a hydrogel sheath from biocompatible polymers on its surface. *Anisakis* larvae (L3) isolated from host fish were cultured in RPMI-1640 medium containing heat-inactivated fetal bovine serum and later hydrogelize using standard procedure developed. The modified nematodes were then washed twice with PBS and observed under fluorescence microscope for hydrogel sheath coating. An assay was conducted to detect its effect on nematode's viability and locomoter functions and it was concluded that this surface functionalization have negligible effect on its viabaility. Hydrogel sheath was evaluated individually for its use as a protective shield against UV light and H<sub>2</sub>O<sub>2</sub> allowing the nematode to be exploited as living cancer remedy.

### How will it help in cancer therapy?

On these hydrogelized films numerous chemotherapeutic particles can be joined which will be then delivered to designated neoplastic locales utilizing this live medication delivery system. Glucose oxidase is one such antineoplastic specialist that was utilized in experiment. It catalyzes separation of D-glucose (wellspring of energy to malignant growth cells) into D-gluconic corrosive and creation of hydrogen peroxide. This lead to depletion of energy source and oxidative activity of hydrogen peroxide eventually leads to death of cancer cells. The HeLa cells lines are utilized for above in vitro study. The significance of using this modified nematode in cancer therapy is ensuring higher chances of chemotherapeutic agent reaching at targeted site.

### Conclusion

Discovery of efficacious drug delivery system will upgrade the possibilities of successful malignant growth treatment. Though some issues

like microbial contaminate carried by live nematode, allergy to parasitic antigens and curtailing impact of live parasite inside host body still need to be addressed. Moreover how to remove a live parasite from host body after treatment is still a point of contention. However this discovery is still decent beginning as far as taking advantage of unsafe parasites for advantage of people.

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