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Major Breakthrough In Oral Cancer Research; Cotarnine Derivative Developed By Two Odisha Institutes Patented

The S-27 cotarnine derivative developed through the research has been studied as a potential anti-cancer compound against Oral Squamous Cell Carcinoma, reports Samir Kumar Acharya.



IISER Berhampur (ETV Bharat)



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By **ETV Bharat English Team**

Published : September 28, 2026 at 10:54 PM IST

research institutions in Odisha has kindled hope in the field of oral cancer treatment.

A novel cotarnine derivative developed from noscapine, an alkaloid obtained from the opium poppy plant, has been granted an Indian patent. Researchers from IISER Berhampur and NIT Rourkela jointly worked on the compound.

The S-27 cotarnine derivative developed through the research has been studied as a potential anti-cancer compound against Oral Squamous Cell Carcinoma (OSCC). However, it is not an approved medicine for human use at present. Further extensive testing, including clinical trials, will be required before it can potentially be developed for therapeutic use.

The cost of oral cancer treatment varies depending on the stage of the disease, complexity of treatment and the medical centre. According to available data, oral cancer treatment in India costs approximately Rs 2.5 lakh to Rs 12 lakh. This financial burden can contribute to delays in treatment for many patients and families. Chemotherapy drugs such as cisplatin, carboplatin, 5-fluorouracil or 5-FU, paclitaxel and docetaxel are used in the treatment of cancers of the oral cavity and oropharynx.

Depending on the patient's condition, the drugs may be administered with or without radiation therapy. Against this backdrop, the research by IISER Berhampur and NIT Rourkela is crucial for its potential to contribute to the development of a new treatment option in the future, potentially at a lower cost.



Prof Harekrishna rout with his team (ETV Bharat)

The key component of the research is noscapine. Cotarnine was prepared through the oxidative degradation of the natural alkaloid obtained from *Papaver somniferum*, commonly known as the opium poppy. The cotarnine was then reacted with an acetophenone such as 4-bromoacetophenone to produce an acetophenone-linked product.

In subsequent stages, methylation and other chemical processes were carried out to develop the S-27 cotarnine derivative. The objective of the research is to study the potential anti-cancer activity of the compound while improving its drug-delivery and formulation properties.

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The joint patent lists Prof Lakshmidhar Rout of IISER Berhampur and Profs Harekrishna Sahu and Vivekananda Mallik of NIT Rourkela, along with L Prusty, P Behera and S Biswal. The patent application number is 202531113686 and it was filed on November 19, 2025, and published on December 12, 2025.

under the Patents Act, 1970, it is stated to have a term of 20 years from November 19, 2025.



Prof Harekrushna Sahu at the laboratory (ETV Bharat)

Prof Rout said a large number of people are affected by oral cancer, while its treatment can be financially difficult for many. He said the research was undertaken keeping this concern in mind. According to him, an anti-cancer compound has been developed through a novel approach. However, he clarified that further research and testing are required before it can be developed into a medicine.

IISER, Berhampur Director Prof Ashok Kumar Ganguly, said research is being carried out at the institute across various fields, with particular emphasis on biological sciences and health-related research. However, he made it clear that clinical trials would be necessary before the compound could be tested in humans.

Prof Ganguly said there is a specific and lengthy process involved in converting a molecule developed in a laboratory into a medicine. Ichina Sahu, a student associated with the research, said she and her colleagues were happy to have achieved the success while research on oral cancer was being carried out in the laboratory.

days. Another student, Amian Swain, said the team would undertake further research on biomedical applications in the future. He said, "We are proud of Prof Lakshmidhar Rout's research achievement".



The team that worked on the cotarnine derivative (ETV Bharat)

Cotarnine is a tetrahydroisoquinoline (THIQ) alkaloid with the chemical formula $C_{12}H_{15}NO_4$. It can be prepared through the oxidative degradation of noscapine. Noscapine is a natural alkaloid obtained from *Papaver somniferum*, or the opium poppy plant. It is chemically different from morphine and codeine and, according to the research information provided, does not act as an intoxicating opioid.

The grant of a patent is an important milestone for the research. However, receiving a patent does not mean that the drug has been approved for human use. The safety and efficacy of the S-27 cotarnine derivative will require further preclinical studies followed by clinical trials. Only if these stages are successfully completed can the compound potentially move towards the subsequent stages of drug development.

The development of a new compound against oral cancer based on an alkaloid obtained from the opium poppy, and its subsequent patenting, marks a notable development for Odisha's research sector. The focus now will be on the necessary

potential therapeutic option.

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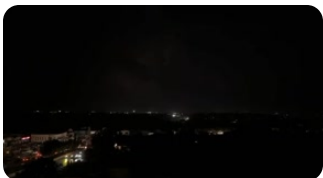
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