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## Treatment of Oat Cell Lung Cancer by using Vitis Based Gold Nanoparticle Drug Leads

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### Keywords

Oat lung cancer cells,  
Gold nanoparticles,  
Vitis Extract,  
Secondary metabolites

### Abstract

Oat lung cancer cells are leading contributors to lung mortality rates. Cancer cells are responsible for tumor growth and re-occurrence through inhibition of drug induced cell death. Various studies on the cancer induction, growth and progression are the multiple effects of cancer studies. Fruits and Vegetables are served as lead molecules for the treatment of cancer due to the presence of phytochemical constituents. Vitis berries are used for table fruits, wines, and raisins, because of a range of health benefits, such as atherosclerosis prevention, anti-oxidation and renal damage prevention.

## 1. INTRODUCTION

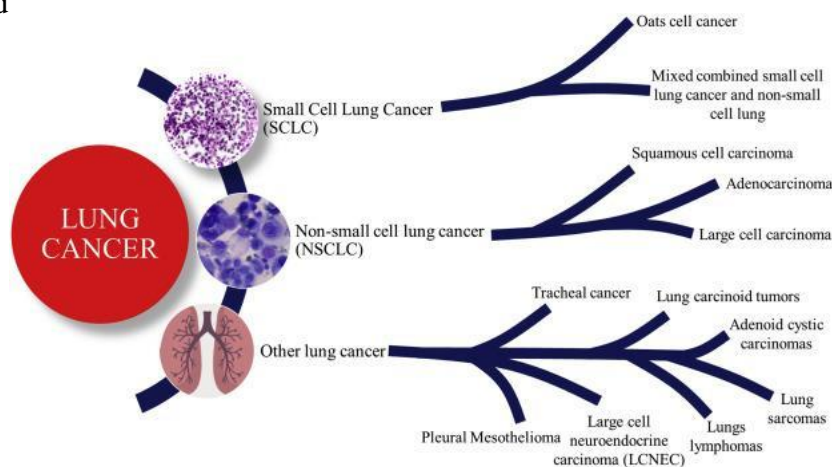
Lung cancer is a life threatening illness that accounts for about 1.80 million of Cancer related deaths worldwide. The probability of relapse is a factor that contributes to the risk of cancer[1]. chemotherapy and Radiation therapy are chemical and physical cancer treatment associated with surgery to enhance their effectiveness[2]. Cancer stem cells are a group of cells that have been reported as contributing to increased mortality in lung cancer[3]. Derived from seeds of vitis. Vitis Seed extraction is high in procyanidins with strong antioxidant



capabilities[4-5]. Vitis seed extraction is mainly used as a health food supplement to improve cardiovascular health[6] Preclinical studies have shown antineoplastic effects of VSE against a variety of cancers, including lung cancer[7-12]. Larger surface to mass ratio or surface to volume ratio-Greater amount of a substance comes in contact with surrounding material. Vitis seed extract contains proanthocyanins- an antioxidant. It is believed to be superior even to vitamin C and vitamin E. This is the reason for VSE becoming such a popular dietary supplement nowadays. The vitis seed proanthocyanins (VSP) have shown a radioprotective effect on the lung cells. Nanoparticles (NPs) are synthetic particles with a diameter of <100 nm that are generally derived from polymers, lipids, or metals such as gold. NPs have proven to be particularly useful in diverse medical applications, from diagnosis to cancer therapy[13-14]. Based on the above facts our research aims to treat the cancer using prepared nano drug molecules and with objectives as follows.

### 1.1 Types of lung cancer's

There are 3 types of Lung cancer which is Small cell lung cancer , Non- Small cell lung cancer and

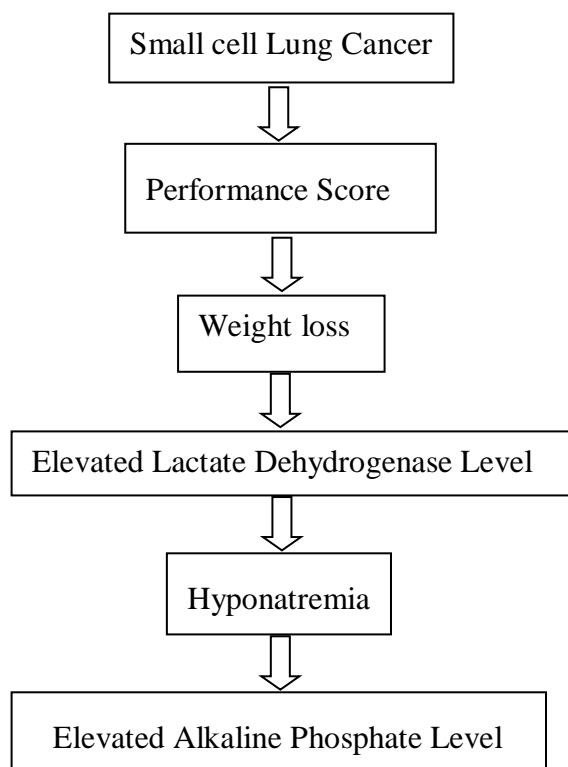


**Figure 1.** Types of lung cancer's

## 2. OBJECTIVES

- ✓ To select the animal cell lines
- ✓ To identify the vitis variety for preparation of vitis extract
- ✓ To prepare gold nano particles and their characterization
- ✓ To identify vitis extract with gold nano particle stability studies
- ✓ To identify efficiency and efficacy of vitis extract gold nano particles on selected lung cancer cell lines

### 3. PROGNOSTIC FACTORS FOR SCLC



**Figure 2:** Flow Chart

### 4. REVIEW OF LITERATURE

Small cell lung cancer (SCLC), previously known as oat cell carcinoma, is considered distinct from other lung cancers, which are called non-small cell lung cancers (NSCLCs). Small cell lung cancers are neuroendocrine tumors of the lung that rapidly grow, are highly malignant, widely metastasize, and, despite showing an initial response to chemotherapy and radiotherapy, have a poor prognosis and are usually unresectable. Cancer has become one of the paramount and most serious health concerns globally, affecting people in both developing and developed countries ([15] Fitzmaurice, C.; Dicker, D.; Pain, A.; Hamavid, H.; Moradi-Lakeh, M.; MacIntyre, M. F.; Allen, C.; Hansen, G.; Woodbrook, R.; Wolfe, C. [16] Kumar, S.; Sharma, A. K.; Lahlmawia, H.; Kumar) Lung cancer is one of the deadliest cancers, accounting for a high mortality rate, and is the most frequent cause of tumor-related fatalities. Small cell lung cancers represent 15-20% of lung cancers and are strongly associated with cigarette smoking. Approximately 90-95% of small cell lung cancers occur centrally, usually arising adjacent to a lobar or main bronchus. Oat cell lung cancer is a common disease which is usually disseminated by the time it is diagnosed. ([17] Gazdar AF, Bunn PA, Minna JD).

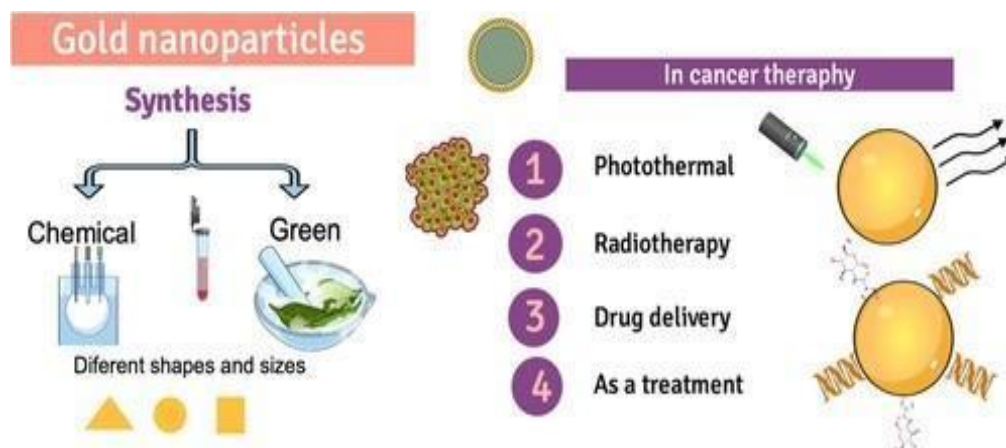
SCLC is an aggressively growing tumor and is categorized into small-cell and "oatcell" cancer combined ([18] Sher, T.; Dy, G. K.; Adjei, A.) Smoking habits, hereditary factors, urbanization, and environmental factors (like exposure to arsenic, toxins, and asbestos) are the primary causative factors contributing to the pathogenesis of lung cancer. ([19-23] Field, R. W.; Withers, B. L.; Dresler, C.; Wogan, G. N.; Hecht, S. S.; Felton, J. S.; Conney, A. H.; Loeb, L. A.; Pérez-Herrero, E.; Fernández-Medarde, A., Eur. J. Pharm. Jiang, X. Q.; Mei, X. D.; Feng, D).

In 2023, an estimated 238,340 adults (117,550 men and 120,790 women) in the United States will be diagnosed with lung cancer. Worldwide, an estimated 2,206,771 people were diagnosed with lung cancer in 2020. ([24] van de Kamp HJ, Molder MT, Schulkes KJG, et al.) These statistics include both small cell lung cancer and NSCLC. The risk of lung cancer increases with age. An estimated 53% of all people diagnosed with the disease are age 70 or older. An estimated 83% of cases are diagnosed in people age 65 or older. Lung cancer is the leading cause of cancer death for men and women worldwide. It is estimated that 127,070 deaths (67,160 men and 59,910 women) from this disease will occur in the United States in 2023. In 2020, an estimated 1,796,144 people died worldwide from the disease. ([25] Approved by the Cancer.Net Editorial Board,) Smoking leads to the greatest risk of developing lung cancer, being responsible for more than 70% of the cases (Lung Cancer NHS). but it is not the only cause. A recent study highlights how exposure of non-smokers to airborne PM2.5 (particulate matter with an aerodynamic diameter of 2.5 µm or less) correlates with the incidence of lung cancer ([26] Gharibvand L., Shavlik D., Ghamsary M., Beeson W.L., Soret S. and Ret al K.)

Vitis vinifera are a well-known grape species from western Asia and southern Europe that belong to the Vitis genus of the Vitaceae family. The vitis vinifera vine's seeds and leaves are employed in herbal therapy, while the fruits are used as a food supplement. Wine production, which takes 50-75 percent of virus, is the most significant application of vitis, followed by fresh fruits, dried fruits, and juice. Several varieties and species of vitis are available in India. Vitis are one of the most important agricultural products. Vitis seed extract (VSE) had been reported to exert antineoplastic properties in preclinical studies. A modified phase I, open-label, dose-escalation clinical study was conducted to evaluate the safety, tolerability, and potential chemopreventive effects of leucoselect phytosome (LP), a standardized VSE complexed with soy phospholipids to enhance bioavailability, in heavy active and former smokers.

Vitis have been used for thousand years because of their nutritional and medicinal benefits. These are rich in sugars, flavonoids, anthocyanin and proanthocyanins, organic acids, tannin, mineral salts and vitamins [27] 21. Kanagarla NA, Kuppast IJ, Veerashekar T, Reddy CL] Vitis are distributed almost all over the world. They are found in China, India, Iran, Egypt, Turkey, Brazil, Mexico, Central and Southern Europe, Western Asia Such as Anatolia, Caucasus, Middle East, China, Africa..etc [28] Parihar S, Sharma D.]

According to the recent studies, the consumption of vitis and vitis products has shown the beneficial health effects which is attributed by the unique mix of polyphenolic compounds [29] Georgiev V, Ananga A, Tsoleva V.]



**Figure 3.** Gold nanoparticles synthesis in cancer therapy

Nanomedicines, especially gold nanomaterials, with their unique and size-dependent properties offer a potential solution to many challenges in the field. The versatility afforded by the shape, size, charge and surface chemistry of gold nanostructures allows them to be adapted for many applications in the diagnosis, treatment and imaging of Lung cancer. Lung cancer (LC) is one of the most deadly cancers worldwide, with very low survival rates, mainly due to poor management, which has barely changed in recent years. ([30] World Health Organization (2018) Cancer Statistics])

## 5. CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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