**FORM 2**

**THE PATENTS ACT, 1970**

**(39 OF 1970)**

**AND**

**THE PATENT RULES, 2003**

**COMPLETE SPECIFICATION**

**(See section 10 and rule 13)**

**Title of Invention:**

# "EVALUATION OF CELLULAR PROPERTIES FOR NON-SMALL CELL LUNG CANCER TREATMENT BASED ON ADVANCED NANOPARTICLE DRUG DELIVERY SYSTEMS"


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The following specification describes the invention and the manner in which it is to be performed.

## FIELD OF INVENTION

The present invention relates to the field of designing and implementing a framework of evaluating the cellular properties for non-small cell lung cancer treatment. The advanced Nanoparticle based drug delivery systems are considered for the study.

## BACKGROUND OF INVENTION

**[0001]** Background description includes information that may be useful in understanding the present invention. It is not an admission that any of the information provided herein is prior art or relevant to the presently claimed invention, or that any publication specifically or implicitly referenced is prior art.

**[0002]** Non-small cell lung cancer is a disease in which malignant (cancer) cells form in the tissues of the lung. There are several types of non-small cell lung cancer. Smoking is the major risk factor for non-small cell lung cancer. Signs of non-small cell lung cancer include a cough that doesn't go away and shortness of breath. Tests that examine the lungs are used to diagnose and stage non-small cell lung cancer.

**[0003]** A number of different types of non-small cell lung cancer analysis systems that are known in the prior art. For example, the following patents are provided for their supportive teachings and are all incorporated by reference.

**[0004]** Advanced Nanoparticle-Based Drug Delivery Systems and Their Cellular Evaluation for Non-Small Cell Lung Cancer Treatment:- Lung cancers, the number one cancer killer, can be broadly divided into small cell

lung cancer (SCLC) and non-small cell lung cancer (NSCLC), with NSCLC being the most commonly diagnosed type. Anticancer agents for NSCLC suffer from various limitations that can be partly overcome by the application of nanomedicines. Nanoparticles is a branch within nanomedicine that can improve the delivery of anticancer drugs, whilst ensuring the stability and sufficient bioavailability following administration. There are many publications available in the literature exploring different types of nanoparticles from different materials. The effectiveness of a treatment option needs to be validated in suitable in vitro and/or in vivo models. This includes the developed nanoparticles, to prove their safety and efficacy. Many researchers have turned towards in vitro models that use normal cells or specific cells from diseased tissues. However, in cellular works, the physiological dynamics that is available in the body could not be mimicked entirely, and hence, there is still possible development of false positive or false negative results from the in vitro models. This article provides an overview of NSCLC, the different nanoparticles available to date, and in vitro evaluation of the nanoparticles. Different types of cells suitable for in vitro study and the important precautions to limit the development of false results are also extensively discussed.

**[0005]** Advanced Nanoparticle-Based Drug Delivery Systems and Their Cellular Evaluation for Non-Small Cell Lung Cancer Treatment:- Lung cancers, the number one cancer killer, can be broadly divided into small cell

lung cancer (SCLC) and non-small cell lung cancer (NSCLC), with NSCLC being the most commonly diagnosed type. Anticancer agents for NSCLC suffer from various limitations that can be partly overcome by the application of nanomedicines. Nanoparticles is a branch within nanomedicine that can improve the delivery of anticancer drugs, whilst ensuring the stability and sufficient bioavailability following administration. There are many publications available in the literature exploring different types of nanoparticles from different materials. The effectiveness of a treatment option needs to be validated in suitable in vitro and/or in vivo models. This includes the developed nanoparticles, to prove their safety and efficacy. Many researchers have turned towards in vitro models that use normal cells or specific cells from diseased tissues. However, in cellular works, the physiological dynamics that is available in the body could not be mimicked entirely, and hence, there is still possible development of false positive or false negative results from the in vitro models. This article provides an overview of NSCLC, the different nanoparticles available to date, and in vitro evaluation of the nanoparticles. Different types of cells suitable for in vitro study and the important precautions to limit the development of false results are also extensively discussed.

**[0006]** The main difference between SCLC and NSCLC is how aggressive they are. Another difference is how common they are. NSCLC is a less aggressive and more common form of lung cancer then SCLC. The proposed

invention focuses on evaluating the impact of Nanoparticle based drug delivery system in treating non-small cell lung cancer.

**[0007]** Above information is presented as background information only to assist with an understanding of the present disclosure. No determination has been made, no assertion is made, and as to whether any of the above might be applicable as prior art with regard to the present invention.

**[0008]** In the view of the foregoing disadvantages inherent in the known types of lung cancer analysis systems now present in the prior art, the present invention provides an improved system. As such, the general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new and improved system to evaluate the impact of advance nanoparticle-based system in treating non-small cell lung cancer that has all the advantages of the prior art and none of the disadvantages.

## SUMMARY OF INVENTION

**[0009]** In the view of the foregoing disadvantages inherent in the known types of lung cancer treatment analysis systems now present in the prior art, the present invention provides an improved one. As such, the general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new and improved system to predict the efficacy of nanoparticle-based drug delivery in treating lung cancer which has all the advantages of the prior art and none of the disadvantages.

**[0010]** The main objective of the proposed invention is to design and

implement a framework of systematic approach for evaluating the efficacy of non-small cell lung cancer treatment. Their invention focuses on analyzing the various advanced Nanoparticle based drug delivery system.

**[0011]** Yet another important aspect of the proposed inventions to design a framework for analyzing the lung cancer patient. The cancer cells and their treatment using Advanced Nanoparticle based drug delivery system. The Artificial Intelligence unit will analyze efficacy of Nanoparticle based drug delivery system and it is displayed on the display unit.

**[0012]** In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of description and should not be regarded as limiting.

**[0013]** These together with other objects of the invention, along with the various features of novelty which characterize the invention, are pointed out with particularity in the disclosure. For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated preferred embodiments of the invention.

## BRIEF DESCRIPTION OF DRAWINGS

**[0014]** The invention will be better understood and objects other than those set forth above will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

Figure 1 illustrates the schematic view of evaluation of cellular properties for non-small cell lung cancer treatment based on advanced nanoparticle drug delivery systems, according to the embodiment herein.

## DETAILED DESCRIPTION OF INVENTION

**[0015]** In the following detailed description, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. These embodiments are described in sufficient detail to enable those skilled in the art to practice the invention, and it is to be understood that the embodiments may be combined, or that other embodiments may be utilized and that structural and logical changes may be made without departing from the spirit and scope of the present invention. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of the present invention is defined by the appended claims and their equivalents.

**[0016]** While the present invention is described herein by way of example using several embodiments and illustrative drawings, those skilled in the art will recognize that the invention is neither intended to be limited to the embodiments of drawing or drawings described, nor intended to represent the

scale of the various components. Further, some components that may form a part of the invention may not be illustrated in certain figures, for ease of illustration, and such omissions do not limit the embodiments outlined in any way. It should be understood that the drawings and detailed description thereto are not intended to limit the invention to the particular form disclosed, but on the contrary, the invention covers all modification/s, equivalents and alternatives falling within the spirit and scope of the present invention as defined by the appended claims. The headings are used for organizational purposes only and are not meant to limit the scope of the description or the claims. As used throughout this description, the word "may" be used in a permissive sense (i.e., meaning having the potential to), rather than the mandatory sense (i.e., meaning must). Further, the words "a" or "a" mean "at least one" and the word "plurality" means one or more, unless otherwise mentioned. Furthermore, the terminology and phraseology used herein is solely used for descriptive purposes and should not be construed as limiting in scope. Language such as "including," "comprising," "having," "containing," or "involving," and variations thereof, is intended to be broad and encompass the subject matter listed thereafter, equivalents, and any additional subject matter not recited, and is not intended to exclude any other additives, components, integers or steps. Likewise, the term "comprising" is considered synonymous with the terms "including" or "containing" for applicable legal purposes. Any discussion of documents, acts, materials, devices, articles and the like are

included in the specification solely for the purpose of providing a context for the present invention.

**[0017]** In this disclosure, whenever an element or a group of elements is preceded with the transitional phrase "comprising", it is understood that we also contemplate the same element or group of elements with transitional phrases "consisting essentially of, "consisting", "selected from the group consisting of", "including", or "is" preceding the recitation of the element or group of elements and vice versa.

**[0018]** Non-small cell lung cancer is the most common type of lung cancer. It grows and spreads more slowly than small cell lung cancer. People with non-small cell lung cancer can be treated with surgery, chemotherapy, radiation therapy, targeted therapy, or a combination of these treatments. People with small cell lung cancer are usually treated with radiation therapy and chemotherapy.

**[0019]** The nano-drug loading system has made significant progress in the detection, diagnosis, and treatment of lung cancer. Nanomaterials are used to specifically target tumor tissue to minimize therapeutic adverse effects and increase bioavailability. The proposed invention focuses on analyzing and evaluating the Nanoparticle based drug delivery system in treating non-small lung cancer.

**[0020]** Reference will now be made in detail to the exemplary embodiment of the present disclosure. Before describing the detailed embodiments that are in

accordance with the present disclosure, it should be observed that the embodiment resides primarily in combinations arrangement of the system according to an embodiment herein and as exemplified in FIG. 1

**[0021]** Figure 1 illustrates the schematic view of evaluation of cellular properties for non-small cell lung cancer treatment based on advanced nanoparticle drug delivery systems 100. The proposed system 100 includes a lung cancer patient depicted as 101. The cancer cells i.e., non-small cell lung cancer cells are depicted as 102. The advanced Nanoparticle based drug delivery systems 103 analysed for their efficacy using the Artificial Intelligence unit 104. The results of Artificial Intelligence unit i.e., which specifies the efficacy of lung cancer treatment are displayed on display unit 105.

**[0022]** In the following description, for the purpose of explanation, numerous specific details are set forth in order to provide a thorough understanding of the arrangement of the system according to an embodiment herein. It will be apparent, however, to one skilled in the art that the present embodiment can be practiced without these specific details. In other instances, structures are shown in block diagram form only in order to avoid obscuring the present invention.

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**WE CLAIM**

1. Evaluation of cellular properties for non-small cell lung cancer treatment based on advanced nanoparticle drug delivery systems comprises of

   Artificial intelligence unit;

   Display unit and

   Drug delivery system.
2. Evaluation of cellular properties for non-small cell lung cancer treatment based on advanced nanoparticle drug delivery systems, according to claim 1, includes an artificial intelligence unit, wherein the artificial intelligence unit will analyse the reports of patients who are suffering from lung cancer to understand the exact condition of the disease.
3. Evaluation of cellular properties for non-small cell lung cancer treatment based on advanced nanoparticle drug delivery systems, according to claim 1, includes a display unit, wherein the display unit will display the predictions of AI.
4. Evaluation of cellular properties for non-small cell lung cancer treatment based on advanced nanoparticle drug delivery systems, according to claim 1, includes a drug delivery system, wherein the drug delivery system is used to deliver various nanoparticles to the cancer cells to understand the efficacy of nanoparticles.

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## ABSTRACT

## EVALUATION OF CELLULAR PROPERTIES FOR NON-SMALL CELL LUNG CANCER TREATMENT BASED ON ADVANCED NANOPARTICLE DRUG DELIVERY SYSTEMS

Evaluation of cellular properties for non-small cell lung cancer treatment based on advanced nanoparticle drug delivery systems is the proposed invention. The invention focuses on analyzing and evaluating the cellular properties in the non-small cell lung cancer treatment. The advanced Nanoparticle based drug delivery system and its efficacy in treating lung cancer is analyzed.



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