Plan Overview

A Data Management Plan created using DMPonline

Title: Epigenetic modulation in lung cancer: diagnostic and therapeutic prospects.

Creator: Iram Rehman

Principal Investigator: Iram Rehman

Project Administrator: Iram Rehman

Affiliation: Edge Hill University

Template: DCC Template

ORCID iD: 0009-0004-3050-9382

Project abstract:

Lung cancer is the 2nd most common malignancy worldwide with Non-Small cell lung cancer(NSCLC) accounting for approximately 80-85% of all lung cancer diagnoses. In NSCLC cells *EGFR* has been identified as the major first genetic abrasion, as carriers of this mutation account for approximately 20% to 30% of NSCLC adenocarcinoma, making it the most suitable target for therapeutic interventions. The second and third-generation targeted therapeutics Afatinib and Osimertinib respectively, have exceptional efficacy for overcoming mutations such as T90M in *EGFR*. The main obstacles that arise from the usage of these compounds are the emergence of resistance and the potential for toxicities that result in severe side effects. The study will address these issues by utilizing *in vitro* models.

Epigenetic modifications are recognized as key factors in the progression of tumours and are also considered a leading cause of poor prognosis of lung cancer treatments. Histone Deacetylase (HDACs) play a crucial role in governing a diverse range of biological processes in both the context of optimal health and the disease state. The regulation of vital cellular processes e.g., (cell proliferation, cell cycle progression, cellular survival, and apoptosis) contributed by HDACs and the dysregulation of HDACs favours the progression of carcinogenesis and development of resistance to therapeutic approaches for NSCLC. Histone Deacetylase inhibitors (HDACi) class of molecules capable of inhibiting the enzymatic activity of HDACs, consequently leading to the activation of multiple genes and modifications of various phenotypic traits as mentioned above. The present study will use valproic acid (VPA) as an epigenetic inhibitor. The primary objective of the study is to investigate the efficacy of two newly targeted therapeutics (proprietary reversible analogues of Osimertinib and Afatinib through a collaboration with the University of Liverpool) in NSCLC cells utilizing *in vitro* models. Other objectives include assessing potential resistance mechanisms, identifying predictors of response and sensitizing the resistant cells with the HDACi. Finally, the role of Extracellular vesicles during anti-EGFR treatment will also be explored.

ID: 124727

Start date: 04-02-2023

End date: 28-02-2027

Last modified: 02-06-2023

Copyright information:

Epigenetic modulation in lung cancer: diagnostic and therapeutic prospects.

Data Collection

What data will you collect or create?

Data will be generated by performing Cell line culture, Usage of targeted therapeutics, usage of Epigenetic inhibitors, RNA /Protein extractions, Protein gels, Western blots, RT qPCR, ELISA for the quantity of expression levels, cytotoxicity, Imaging, usage of nanoparticles for encapsulating the targeted therapeutics, finally Isolation of Extracellular vesicles and their characterization by Western blots, TEM for size and shape, DLS for measuring size, NTA for measuring the concentration of nanoparticles and analysis of all the above.

Quantitative data measured will be recorded as Matlab or Excel files. Data analysis and statistics will be performed in SPSS, Graph Pad Prism, Matlab or Excel. Most imaging data will be in the standard format obtained from commercial microscopes e.g., (lif Leica)

How will the data be collected or created?

Data will be generated through experimentation in the lab. The raw data will be saved for analysis for the PIs departmental desktop and uploaded to Google Drive Folder shared with the project supervisors.

Files will be named with the date of the experiment and the analysis performed e.g.,(01-07-2023_WB sample A) A .txt file will be included in the data folder, giving more information on the data).

The folder structure will be: "PhD Title, year, month, week".

Documentation and Metadata

What documentation and metadata will accompany the data?

Standard EHU metadata forms will accompany the data by EHU guidelines.

Ethics and Legal Compliance

How will you manage any ethical issues?

No sensitive data will be collected. An ethics application has been submitted to the respective EHU Ethical Committee.

How will you manage copyright and Intellectual Property Rights (IPR) issues?

There is a requirement for timely data sharing, with the understanding that a limited, defined period of exclusive use of data for primary research is reasonable according to the nature and value of the data e.g., (IP protection and patent filing).

PI, Secondary researchers and EHU will be responsible for the copyright and IPR.

Storage and Backup

How will the data be stored and backed up during the research?

Data, Scanned images and analyses will be stored primarily on the PIs desktop. Furthermore, they will be uploaded online in One Drive and Google Drive folders, which will be shared with the project's supervisors. Finally, all data and analyses will be stored on external hard drives as local backup.

How will you manage access and security?

The aforementioned data-sharing services, as well as EHU desktops, require personal login details and user permissions, therefore security is ensured.

Selection and Preservation

Which data are of long-term value and should be retained, shared, and/or preserved?

All data will be kept for at least 10 years, as per EHU regulations

Data that might lead to IP or publications will be prioritized if a choice on which data to preserve has to be made.

What is the long-term preservation plan for the dataset?

Data, Scanned images and analyses will be stored in EHU servers which are automatically and regularly backed up (off-site) for a minimum of 10 years. All data and analyses will also be stored on external hard drives as an external backup.

Data Sharing

How will you share the data?

Data originating from this project will be open to the wider community and made publicly available through published in scholarly journals (e.g., New England Journal of Medicines, Molecular Cancer Therapeutics, Journal of Thoracic Oncology and BioMed Central) and through presentations at national and International conferences.

Moreover, data will be accessible via recommendation, web search or within the department; this is typical thesis work generated within EHU. The data will become available upon completion of the project but preliminary data created or collected will be accessible in person via the PI, or in special cases digitally upon request within the months before project completion.

Are any restrictions on data sharing required?

There is a requirement for timely data sharing, with the understanding that a limited, defined period of exclusive use of data for primary research is reasonable according to the nature and value of the data (e.g., for IP protection and patent filing).

Responsibilities and Resources

Who will be responsible for data management?

The PI (Iram Rehman) will be responsible for all data management (data collection, storage and backup, archiving, sharing, metadata etc). If the PI is unable to own responsibility, then this will pass to the project supervisors.

What resources will you require to deliver your plan?

All resources (equipment and training) required for the successful completion of this project are already provided by EHU. In the event that additional training or equipment is required, the matter will be discussed with the supervisors and laboratory managers.