BIONIC - BIOsynthetic production of tobacco-free NICotine and related pyridine-based alkaloids

A Data Management Plan created using DMPonline

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Project abstract:

Cultivated tobacco (Nicotiana tabacum) is the most commonly grown and studied species of all plants in the genus Nicotiana noted for the production of the potent alkaloid nicotine. The widespread use of tobacco is due to the addictive effects of nicotine which can be extracted from tobacco plants but requires further downstream processing to obtain pharmaceutical grade quality (>95%) for smoke-free tobacco cessation products. Biocatalysis provides a sustainable and ‘green’ alternative to cost prohibitive chemical processes minimising the waste and chemical steps needed to achieve optically pure nicotine. To date, a clear understanding of the enzyme(s) involved in the later stages of nicotine biosynthesis remains elusive. A main goal of the project is focused on enzyme discovery from a sequence-based metagenomics approach to strategically mimic the biosynthesis of high-valued tobacco-free nicotine and other pyridine-related products. Moreover, the newly discovered enzyme(s) will create de novo pathways to functionalised pyridine building blocks such as agrochemical and pharmaceutical intermediates inaccessible in the current biocatalyst toolbox. Intensification of these enzymatic processes will also be investigated to demonstrate high performance and increased space-time yields to be implemented on an industrial scale.

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Manchester Data Management Outline

- Funder
- Yes - Part of a collaboration and owning or handling data

The applicant will be collaborating with an Industrial Partner (Prozomix Ltd) an SME that will provide metagenomic libraries of enzymes and sharing protein sequence data.

- Acquire new data

Raw data will be collected, analysed and stored from wet lab experiments.

- P Drive (postgraduate researchers and students only)
- University of Manchester Research Data Storage Service (Isilon)

The University of Manchester’s Research Data Management Service (RDMS), which satisfies the Research Council UK RDM guidelines, is eligible for research staff will be used in this project as it provides safe, resilient, secure and managed replicated storage of scientific data. This service allows researchers to manage, store, and curate the data, as well as to preserve it after the end of the project

- < 1 TB
- No
- 5 - 10 years

According to University of Manchester's RDMS Policy, relevant data that are likely to have long term value, including data that demonstrate research findings or represent records of the University, will be preserved (5-10 years) and curated after project completion for as long as they remain of value.

- No sensitive or personal data

Not applicable

- Not applicable
- Not applicable
- Not applicable
- No

Line Manager, Dr. Ian Rowles

2020-06-05

Data areas and data types

The analysis will generate raw mass spectrometry files, UV-HPLC traces. Data will be acquired and stored on University Managed PCs and Laptops with large storage space, older data being archived to removable large capacity storage. Archived media will be stored at a secure secondary location.

Standards and metadata

The Fellow and the collaborator (Prozomix) will be responsible for quality of the data acquisition and the data management, ensuring the collection methods employed, is reproducible, consistent and reliable through standardized operating protocols. Regular check-ups on both the methodology and data collection methods will be reviewed and assessed by experienced colleagues to ensure the highest standards are met. Detailed descriptions of the experimental procedure will be stored and disseminated through high-impact publications and conference presentations.

Relationship to other data

Any novel DNA or protein sequence/structural data collected as part of this project will be deposited in public databases (e.g. Genbank, Protein Data Bank, etc.) to make the data available to the wider scientific community.

Secondary Use

Experimental methods and protocols will be included in the main text of the publications or as supporting information. The Fellow is fully aware of the University's policy to subsidise or fully fund Open access articles through the depositing of 'just accepted articles' and the acknowledgement of research grants provided by the UK research councils (e.g. BBSRC). This is funded through the Gold Open Access Scheme ensuring his research is widely read as possible.

Methods for data sharing

All plasmids and strains constructed will be archived and made available to share with academics upon request after completing a Materials Transfer Agreement (MTA).

Proprietary data

In order to protect intellectual property and respect confidentiality with the industrial partner (Prozomix) some restrictions may be necessary, but they will be minimised as far as practicable.

Timeframes

The data generated during the Fellowship will be released in accordance with established practices within the relevant research disciplines. Data that will be made available through scientific publication will be written up and submitted promptly.

Formats

Data from HPLC and GC data will be in .D and converted to .csv format for analysis, furthermore .xlxs format for Plate readers.