**DATE: Day 1st Month May Year 2025**

# SUMMARY of
## FY2024 RESEARCH RESULTS REPORT
## For International Collaborative Research with IPR, Osaka University

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| **Research Title** | | **A systems biology approach to overcoming treatment resistance in B-cell malignancies** |
| **Applicant** | **Name** | **Simon Mitchell** |
| | **Affiliation** | **Brighton and Sussex Medical School, University of Sussex, UK** |
| | **Present Title** | **Reader in Cancer Research** |
| **Research Collaborator (Host PI)** | | **Mariko Okada （Professor）** |


**Summary**

The collaboration between the Okada and Mitchell groups in Osaka University and the University of Sussex is investigating the extent to which personalized computational models can predict prognosis and response to treatments in cancer. Both groups have recently published work showing that, in both breast cancer and blood cancer, personalized models can stratify patients using molecular scale data to predict how patients will respond over much longer timescales.

The results are demonstrating that molecular signaling controls distinct cell fates that control how cells proliferate and respond to targeted therapies. They have revealed an important role for cellular senescence, controlled by the molecular dynamics of both cRel and NF-kB, which presents a novel point of control in cancer. They have also demonstrated that when generic simulations are personalized to represent individual patients, using either molecular signalling dynamics or mutational profiles of each patient, they can provide valuable clinical tools.

Using the data they have generated during this research visit they have secured substantial ongoing research funding (approximate value £150,000). The first award is a PhD studentship awarded with co-supervision between the two institutions to investigate how to combine experimental and computational biology to move towards personalized medicine in breast cancer. The second award is joint funding from JSPS and the Royal Society to enable the groups to work together on achieving their shared goals.

They have no generated shared data showing profiling the response of breast cancer cells to glucocorticoid receptor stress. Through this collaboration they have generated valuable data characterizing NF-kB abundance with flow cytometry, NF-kB nuclear localization, and the interaction with glucocorticoid nuclear localization in a library of breast cancer cell lines. This data forms the foundation of upcoming publications. They will now develop novel computational models that capture this new dataset and describe, for the first time, the interplay between these two systems. Their results, ongoing funding, and future publications combine to pave the way for personalized treatment in multiple cancers.


***Deadline: May 9, 2025**
***Please submit it to E-mail: tanpakuken-kyoten@office.osaka-u.ac.jp.**
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