Technology Transfer Opportunity

Bioluminescent quantification of mammary tumour development

OPPORTUNITY:
Novel research tool to early detect and quantify breast cancer progression in transgenic mouse models.

Description of Technology:
Homozygous mouse model expressing the luciferase reporter gene under the control of a mammary tissue-specific promoter (MMTV-Luc2 mice). The animals are suitable for cross-breeding with already existing strains or as a background strain for new models in order to evaluate the development and progression of mammary tumours.

Value Proposition:
Conventional transgenic mouse models for breast cancer rely on palpation and mechanical measurement of tumour size and are hence unsuitable for early detection, monitoring and reliable quantification of tumour progression.

Making use of readily quantifiable bioluminescence, the present mouse model allows for a sensitive and reliable assessment of spontaneous mammary tumours in genetically modified mice.
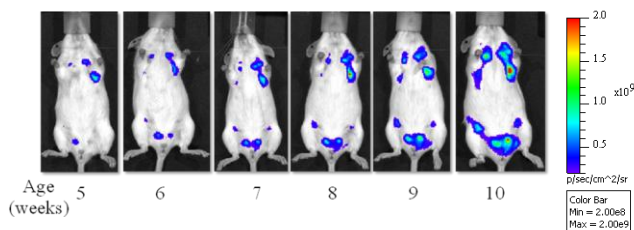

Fig 1: Longitudinal measurement by luminescent imaging of tumour localisation and progression in mouse model expressing the PyVT oncogene

The MMTV-Luc2 mice provide for a useful research tool to investigate breast cancer oncogenes/tumour suppressor genes and to test drug efficacies in the treatment of mammary tumours in transgenic animals.

Main features:
- Powerful technology platform for sensitive and mammary tissue-specific tumour visualisation using bioluminescence
- Quantitative assessment of mammary tumour development *in vivo*
- Low background
- Simple cross-breeding enables assessment of oncogene of choice
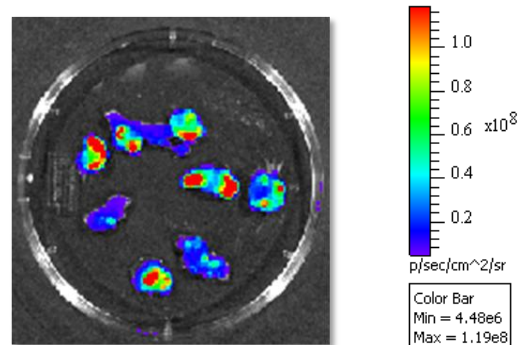- Primary strain for new transgenic models for breast cancer

Fig. 2: *Ex vivo* imaging of luminescent mammary tumours

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List of manuscripts with the contribution of the Fellow which have been submitted or are under preparation:

Submitted:

S. McGee, D.P. O'Connor, A.M. Zagozdzon, **R. Zagozdzon**, D.J. Brennan, A. O'Connor, J. Crown, A. Byrne, M.J. Duffy, W.M. Gallagher. Down-Regulation of SerpinB2/PAI-2 Promotes Breast Cancer Progression. (submitted to Cancer Medicine)

Under preparation:

1. P.C. O'Leary, R.T. Dolan, S. Penny, C.M. Kelly, S. Madden, E. Rexhepaj, D.J. Brennan, A.H. McCann, F. Pontén, M. Uhlén, **R. Zagozdzon**, M.J. Duffy, M.R. Kell, K. Jirström and W.M. Gallagher. Systematic Antibody Generation and Validation via Tissue Microarray Technology Identifies a Novel 3-Protein Prognostic Panel in Breast Cancer. (target journal Breast Cancer Research)
2. P.C. O'Leary, D.J. Brennan, D.P. O'Connor, B.T. Hennessy, A.M. Gonzalez-Angulo, G.B. Mills, K Jirström, F. Ponten, J Crown, W.M. Gallagher, **R. Zagozdzon**. Peroxiredoxin-1 protects against oxidative stress-induced suppression of the estrogen receptor and is a biomarker of favourable prognosis in estrogen receptor-positive breast cancer. (target journal: Clinical Cancer Research)
3. A.J. Eustace, P. O'Leary, W.M. Gallagher, S. Rani, C. Gallagher, B.C. Browne, M. McDermott, L. O'Driscoll, **R. Zagozdzon**, W. Watson, J. Crown, N. O'Donovan. Acquired Sensitivity to TRAIL in lapatinib resistant HER2-positive breast cancer cell lines. (target journal Breast Cancer Research)