BCHM 421/422 – 2019/2020

Project Outline:
MicroRNAs (miRNAs) are non-coding RNAs that silence mRNAs to modulate gene expression. Gain or loss of miRNAs have been reported in cancers at risk of spreading to other tissues (metastasis). Metastasis is a frequent problem in patients with malignant melanoma, and this contributes to low survival rates.

This project will use a combination of bioinformatics and wet lab research to identify miRNAs that are downregulated in melanomas, and are candidate tumour suppressor genes. The student will identify predicted target genes and pathways under control of these miRNAs. To build on these bioinformatics results, the student will grow melanoma cell lines with inducible expression of selected tumour suppressor miRNAs. The effects of rescue of miRNA expression on melanoma cell growth, and cell motility will be analyzed using an IncuCyte ZOOM system (1, 2). The effects of the miRNA on gene expression will be profiled using quantitative reverse-transcription PCR and immunoblotting (3).

The student will gain valuable insights into cancer bioinformatics and molecular cell biology techniques and skills.

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Project Title: Defining targets of tumour suppressor microRNAs in malignant melanoma

References:

1. T Baldassarre, P Truesdell and AW Craig (2017) **Endophilin A2 promotes HER2 internalization and blockade by Trastuzumab in HER2-positive breast cancer**, Breast Cancer Research, Oct 3;19(1):110.
2. Sarah Nersesian, Rodette Williams, Dan Newsted, Kavan Shah, Stephanie Young, P. Andrew Evans, John S. Allingham and Andrew W. Craig (2018) **The macrolide toxin mycalolide B disrupts actin-driven invasion and metastasis of HER2-positive cancers,** Sci Rep, 8(1):17243.
3. Kathleen Watt, Daniel Newsted, Elena Voorand, Robert Gooding, Adrianna Majewski, Peter Truesdell, Binchen Yao, Thomas Tuschl, Neil Renwick, and Andrew W Craig (2018) **MicroRNA-206 suppresses TGF-β signaling to limit tumor growth and metastasis in lung adenocarcinoma,** Cell Signal, 50:25-36.