A/Professor Helen Abud

Head, Epithelial Regeneration Laboratory

Monash Biomedicine Discovery Institute
Cancer Program

OTHER PROGRAM AFFILIATIONS

Development and Stem Cells

Infection and Immunity

EMAIL helen.abud@monash.edu

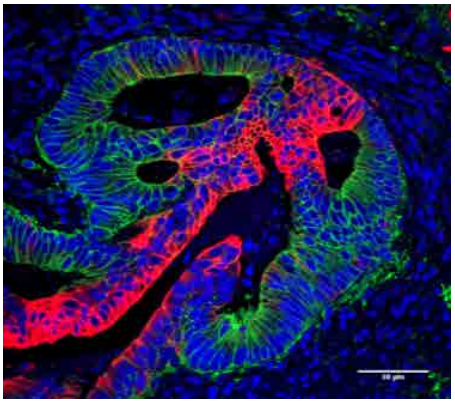
TELEPHONE +61 3 9902 9113

WEB med.monash.edu/anatomy/research/epithelial-regen.html

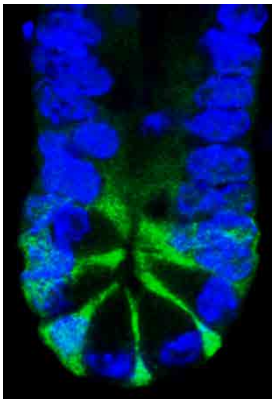
The intestinal epithelium or bowel lining is a regenerative tissue that is constantly renewed throughout life via a small population of stem cells. We study how growth and differentiation of intestinal epithelial cells is regulated using genetic models and organoid or "mini gut" cultures from mouse and human tissue. Our research is centred on understanding the molecular mechanisms and environmental influences that regulate stem cells during development and regeneration of tissue following damage. The bowel is very vulnerable to a variety of pathologies including cancer which involves the development of polyps before progressing to more invasive, malignant carcinomas. We are aiming to analyse the role of candidate molecules in regulating stem cells in normal tissues, degenerative diseases and colon cancer.

Research Projects

1. **Role of stem cell activity in the initiation and progression of colorectal cancer**
2. **Molecular regulation of intestinal stem cells during development and regeneration of tissue following damage**
3. **Analysis of environmental influences on the intestinal epithelium**
4. **Using organoid culture to model tumour responses**



i. Human colorectal carcinoma composed of undifferentiated (green) and differentiated (red) compartments.



ii. A crypt from the small intestine showing stem cells in the base of crypts (green).

Selected significant publications:

1. Nefzger CM, Jardé T, Rossello FJ, Horvay K, Knaupp AS, Powell DR, Chen J, **Abud HE**# and Polo JM#. 2016. A versatile strategy for isolating a highly enriched population of intestinal stem cells. *Stem Cell Reports* 6(3): 321–329. (#Joint senior authors)
2. Horvay K, Jardé T, Casagranda F, Perreau V, Haigh K, Nefzger C, Akhtar R, Gridley T, Berx G, Haigh J, Barker N, Polo JM, Hime GR and **Abud HE**. 2015. Snai1 regulates cell lineage allocation and stem cell maintenance in the mouse intestinal epithelium *EMBO J*. 34 (10): 1319-35.
3. Jardé T, Kass L, Staples M, Lescesen H, Carne P, Oliva K, McMurrick P and **Abud HE**. 2015. ERBB3 positively correlates with intestinal stem cell markers but marks a distinct non proliferative cell population in colorectal cancer. *PLoS One* 10(9): e0138336.
4. Rickard JA, O'Donnell JA, Evans JM, Lalaoui N, Poh AR, Rogers T, Vince JE, Lawlor KE, Ninnis RL, Anderton H, Hall C, Spall SK, Phesse TJ, **Abud HE**, Cengia LH, Corbin J, Mifsud S, Di Rago L, Metcalf D, Ernst M, Dewson G, Roberts AW, Alexander WS, Murphy JM, Ekert PG, Masters SL, Vaux DL, Croker BA, Gerlic M, Silke J. 2014. RIPK1 regulates RIPK3-MLKL-driven systemic inflammation and emergency hematopoiesis. *Cell* 157(5):1175-88.
5. Horvay K, Casagranda F, Gany A, Hime GR, and **Abud HE**. 2011. Wnt signalling regulates Snai-1 expression and cellular localisation in the intestinal epithelial stem cell niche. *Stem Cells and Development* 20(4): 737-45.