

Research Theme: Cancer Biology
Research Project Title: Elucidation of caspase-independent cell death pathways in cancer
Principal Investigator/Supervisor: Assoc Professor Valerie Lin
Co-supervisor/ Collaborator(s) (if any):
Project Description
<p>a) Background:</p> <p>Cancer is a disease of uncontrolled cell growth. Solid tumor mass in the primary or metastatic tumor site causes death by impeding organ function. The goal of cancer therapy is to eliminate tumor masses through inducing cell death. Cytotoxic agents and targeted therapies induce apoptosis through activating pathways such as DNA damage and cellular stress. There are also non-apoptotic forms of cell death including necroptosis, pyroptosis, and autophagy-dependent cell death. Most forms of cell death converge on the activation of executioner caspases 3, 6 or 7 that drive the destruction of cellular structures such as the cytoskeleton, cell membrane and nucleus. Although there have also been a few reports of caspase-independent cell death, the mechanism is poorly understood. Knowledge of novel proteins and signaling pathways of cell death may shed light on new targets for cancer therapy.</p> <p>b) Proposed work:</p> <p>We have established a breast cancer cell model that responds to progesterone with massive cell death. However, biochemical analysis indicated a caspase-independent mode of cell death. The objective of the project is to identify and characterize novel regulatory networks of progesterone induced cell death in breast cancer cells. We have identified major transcriptomic changes associated with progesterone-induced cell death. Proteomic analysis will be conducted to identify changes in proteins levels and post-translational modifications. The involvement of candidate proteins in cancer cell death will be evaluated using genetic tools and cell biology techniques. The long-term goal is to identify proteins and pathways that can be exploited to induce cancer cell death. General molecular and cell biology techniques, and transcriptomics and proteomics tools will be applied in the study.</p>
Supervisor contact:
If you have questions regarding this project, please email the Principal Investigator: cclin@ntu.edu.sg
SBS contact and how to apply: Associate Chair-Biological Sciences (Graduate Studies) : AC-SBS-GS@ntu.edu.sg Please apply at the following: Application portal: https://venus.wis.ntu.edu.sg/GOAL/OnlineApplicationModule/frmOnlineApplication.ASPX