Tumor Biology Laboratory

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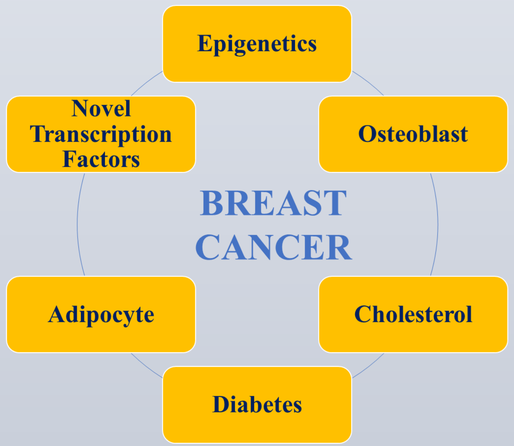
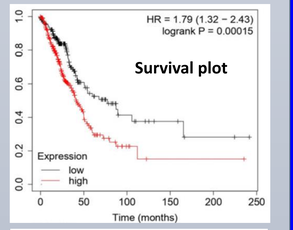
This laboratory, under the leadership of **Prof. Chandi C. Mandal** aims at understanding molecular mechanisms of dysregulated gene expressions and cellular signaling networks associated with debilitating cancer diseases, by carrying out cell-based experiments, cancer tissue and database analysis. Exploring the impact of various metabolic disorders including diabetes, obesity and hypercholesterolemia, and extrinsic risk factor (cold temperature) on the peculiar trans-differentiation property of epithelial breast cancer cells into osteoblast- and adipocyte-like cells is a major focus. Non-toxic drug candidates are preferred to cease dysregulated signaling pathways via hindering the gene targets. Research of this laboratory also seeks to examine if cholesterol-lowering statins, omega-3 fatty acids and anti-diabetic metformin can be combined with other anti-cancer drugs to show better.

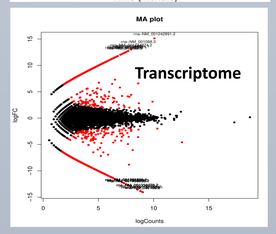
Research Focus



Current Objectives

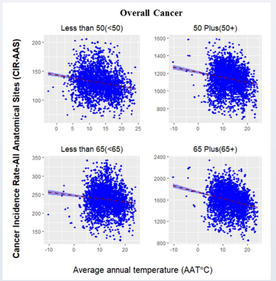
- To identify the novel genes that can be a potent biomarker for breast cancer diagnosis and prognosis.
- To unveil the relationship of adipocytes and osteoblast with breast cancer cells and its impact on tumor growth and metastasis.
- To identify molecular understanding in high cholesterol-induced cancer growth with epigenetics.
- Investigating the target identification for obesity- and diabetes-mediated tumorigenesis.

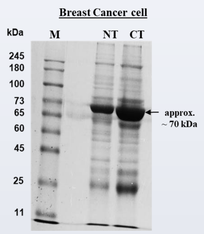




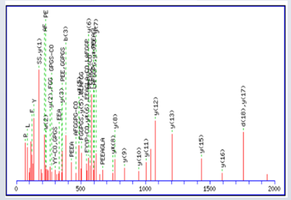
Link between Cold Environment, Cholesterol and Cancer

Different parameters	Correlation coefficient
AAT vs ATC(Cholesterol)	-0.352
ATC vs CMR-overall	0.277
ATC vs CMR-Lung	0.486
ATC vs CMR-Bladder	0.248
ATC vs CMR-Ovarian	0.285
ATC vs CMR-Pancreas	0.444
ATC vs CMR-Breast	0.238
ATC vs CMR-Skin	0.095
ATC vs CMR-Liver	-0.276
ATC vs CMR-Cervix	-0.504



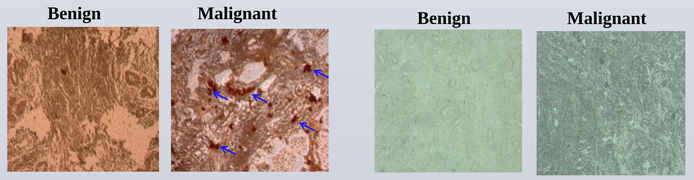


MS-MS Spectrum



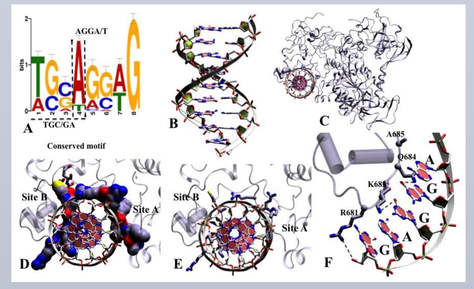
Cold environment may promote cancer mortality and/or incidence, presumably by increasing cellular cholesterol level with concomitant induction of an unexplored ‘zinc finger protein’, addressed as an oncogene.

Cancer and Calcification



Alizarin Red and ALP staining revealed presence of micro-calcification and osteoblast-like potential in malignant breast tumor.

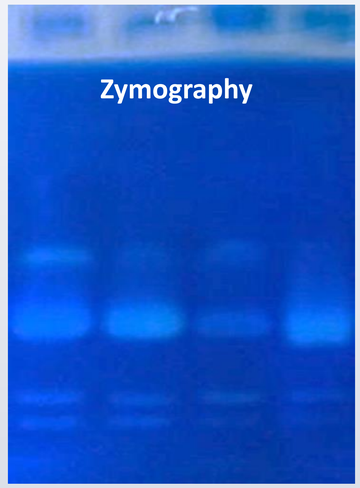
Cancer and Epigenetics

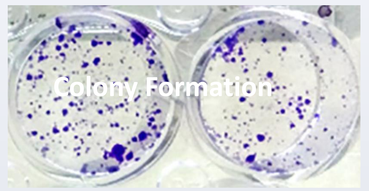


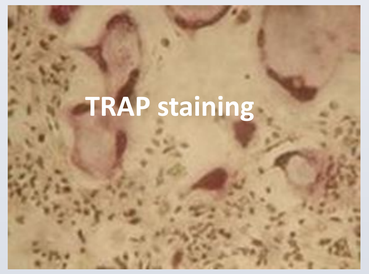
Amino acids having CG nucleotides in their codons are the most mutation prone residues and the presence of a consensus motif ‘T/AGC/GAGGA/TG’ along with CG might be a signature in the mutation-prone zones.

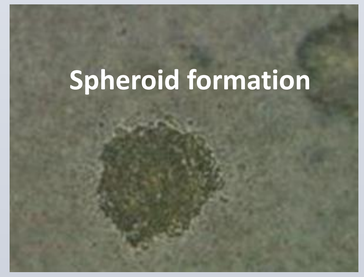
Funding Support

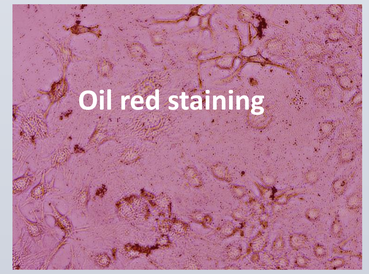
Experiments in Laboratory











Research Activities