Genomics and Proteomics Research Center

Department of Biotechnology

Koneru Lakshmaiah Education Foundation

Salient Features

- Cutting-edge Research and Technology
- Interdisciplinary Collaboration
- Translation and Application

Goal: To establish state of art facility At KL Deemed University to understand and identify specific disease marker against Brain cancer, Breast cancer using functional genomics and proteomics facility.

Objectives

1. Understanding genetic, epigenetics aspects of various cancers
2. In depth investigation of proteomic modifications in brain, breast and Blood cancers
3. Molecular aspects of cancer disease diagnosis *via* miR-lncRNA expression in patient samples
4. Methods to investigate the microbial pathogenesis by proteomics and genomics approach.

Group Head: **Dr. M. Janaki Ramaiah, Professor Biotechnology**

Team Members

Dr. Nadheem Siddique, Assoc Professor

Dr. Y. Rajesh, Assistant Professor

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Dr. Burra PVLS Prasad, Professor

Dr. Ragini Singh, Associate Professor

Dr. B. Srinivas, Associate Professor

References

Mekala, J. R., Kurappalli, R. K., Ramalingam, P., & Moparthi, N. R. (2021). N-acetyl l-aspartate and Triacetin modulate tumor suppressor MicroRNA and class I and II HDAC gene expression induce apoptosis in Glioblastoma cancer cells in vitro. *Life sciences*, *286*, 120024.

Mekala, J. R., Ramalingam, P. S., Mathavan, S., Yamajala, R. B., Moparthi, N. R., Kurappalli, R. K., & Manyam, R. R. (2022). Synthesis, in vitro and structural aspects of cap substituted Suberoylanilide hydroxamic acid analogs as potential inducers of apoptosis in Glioblastoma

cancer cells via HDAC/microRNA regulation. *Chemico-biological interactions, 357*, 109876.

Srinivas, C., Swathi, V., Priyanka, C., Anjana Devi, T., Subba Reddy, B. V., Janaki Ramaiah, M., ... & Bhadra, M. P. (2016). Novel SAHA analogues inhibit HDACs, induce apoptosis and modulate the expression of microRNAs in hepatocellular carcinoma. *Apoptosis*, *21*, 1249-1264.
Srinivas, C., Swathi, V., Priyanka, C., Anjana Devi, T., Subba Reddy, B. V., Janaki Ramaiah, M., ... & Bhadra, M. P. (2016). Novel SAHA analogues inhibit HDACs, induce apoptosis and modulate the expression of microRNAs in hepatocellular carcinoma. *Apoptosis*, *21*, 1249-1264.

Ramaiah, M. J., Lavanya, A., Honarpisheh, M., Zarea, M., Bhadra, U., & Bhadra, M. P. (2014). miR-15/16 complex targets p70S6 kinase1 and controls cell proliferation in MDA-MB-231 breast cancer cells. *Gene*, *552*(2), 255-264.

Janaki Ramaiah et al. (2023). High glucose modulates cancer cell fate by regulation of mTOR-HDAC-microRNA aixs. Research square. MEBR revison

Protein signalling pathways identified in GBM cancer.

In case high glucose and rapamycin treatment the down-regulated genes such as Bromodomain adjacent to zinc finger domain protein 2B 0.00729913; Protein phosphatase 1 regulatory subunit 3A; Transcription initiation factor TFIID subunit 9 0.160413561; Rho guanine nucleotide exchange factor 26 0.29819726; Cell division cycle 5-like protein 0.326279793, Mitogen-activated protein kinase kinase kinase 0.357006971; Rho GTPase-activating protein 9 0.339595511; Epidermal growth factor receptor 0.394553708, Histone-lysine N-methyltransferase SETD1A 0.436049294; Ribosomal protein S6 kinase alpha-3 0.491644208.The genes that are upregulated in rapamycin are Cullin-4A 2.013752683, Microtubule-associated protein 4 2.944679677; Histone-lysine N-methyltransferase 21.54190124

In high glucose and torin treated U87MG cells histone lysine N-methyltransferase 0.016739231; LIM domain-containing protein ajuba 0.186373986. Protein kinase C-binding protein 1 0.339595511; Microtubule-associated protein 1S 0.491644208; Guanine nucleotide exchange factor subunit RIC1 0.477113911. Further, the genes that are upregulated torin treated samples Rho guanine nucleotide exchange factor TIAM1 41.33; Mitogen-activated protein kinase kinase kinase 42.247907992. Over all the score below 0.5 are down-regulated protein expression and above 2.0 are considered as upregulated genes

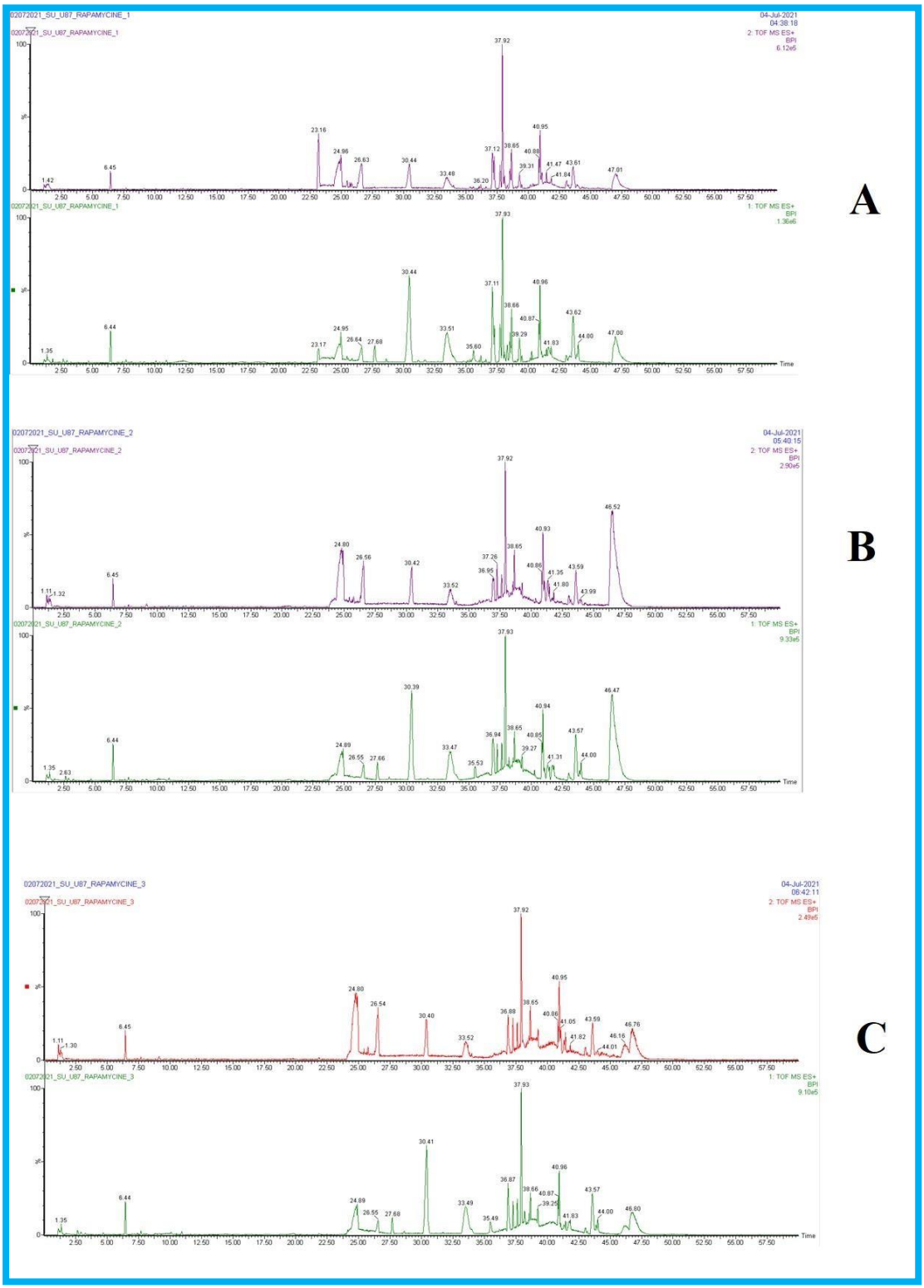

Figure 1. U87MG cells grown in high glucose and then treated with Rapamycin. The Rapamycin treated GBM cancer cells were subjected to proteomics study. A, B, C represents 3 runs.

Realtime PCR

Fermentation

Flow-cytometry

Multimode varioskan

HPLC

Computer system for analysing data

-20 ^{0}C fridge

List of Publications:

S.No	Authors	Title	Year	Source title
1	Mekala J.R.; Ramalingam P.S.; Mathavan S.; Yamajala R.B.R.D.; Moparthi N.R.; Kurappalli R.K.; Manyam R.R.	Synthesis, in vitro and structural aspects of cap substituted Suberoylanilide hydroxamic acid analogs as potential inducers of apoptosis in Glioblastoma cancer cells via HDAC /microRNA regulation	2022	Chemico-Biological Interactions
2	Ramaiah M.J.	Corrigendum to â€œmTOR inhibition and p53 activation, microRNAs: The possible therapy against pandemic COVID-19â€ [Gene Rep. 20 (2020) 100765](S2452014420301795)(10.1016/j.genrep.2020.100765)	2021	Gene Reports
3	Ramaiah M.J.; Kumar K.R.	mTOR-Rictor-EGFR axis in oncogenesis and diagnosis of glioblastoma multiforme	2021	Molecular Biology Reports
4	Ramaiah M.J.; Tangutur A.D.; Manyam R.R.	Epigenetic modulation and understanding of HDAC inhibitors in cancer therapy	2021	Life Sciences
5	Naushad S.M.; Janaki Ramaiah M.; Kutala V.K.; Hussain T.; Alrokayan S.A.	Pharmacogenetic determinants of thiopurines in an Indian cohort	2021	Pharmacological Reports
6	Mekala J.R.; Kurappalli R.K.; Ramalingam P.; Moparthi N.R.	N-acetyl L-aspartate and Triacetin modulate tumor suppressor MicroRNA and class I and II HDAC gene expression induce apoptosis in Glioblastoma cancer cells in vitro	2021	Life Sciences

7	Ramaiah M.J.; Divyapriya K.; Kumar S.K.; Rajesh Y.B.R.D.	Corrigendum to â€œDrug-induced modifications and modulations of microRNAs and long non-coding RNAs for future therapy against Glioblastoma Multiformeâ€ [Gene 723 (2020) 144126] (Gene (2020) 723, (S0378111919307851), (10.1016/j.gene.2019.144126))	2021	Gene
8	Ramaiah M.J.	mTOR inhibition and p53 activation, microRNAs: The possible therapy against pandemic COVID-19	2020	Gene Reports
9	Ramaiah M.J.; Karthikeyan D.; Mathavan S.; Yamajala R.B.R.D.; Ramachandran S.; Vasavi P.J.; Chandana N.V.	Synthesis, in vitro and structural aspects of benzothiazole analogs as anti-oxidants and potential neuroprotective agents	2020	Environmental Toxicology and Pharmacology
10	Janaki Ramaiah M.; Divyapriya K.; Kartik Kumar S.; Rajesh Y.B.R.D.	Drug-induced modifications and modulations of microRNAs and long non-coding RNAs for future therapy against Glioblastoma Multiforme	2020	Gene
11	Banoth S.; Tangutur A.D.; Anthappagudem A.; Ramaiah J.; Bhukya B.	Cloning and in vivo metabolizing activity study of CYP3A4 on amiodarone drug residues: A possible probiotic and therapeutic option	2020	Biomedicine and Pharmacotherapy
12	Ramaiah M.J.; Vasavi P.J.; Chandana N.V.	Potentials of miR-15/16 targeting cancer stem cell pathways: Novel implication in cancer chemotherapy	2020	Gene Reports

13	Ramaiah M.J.	Corrigendum to â€œFunctions and epigenetic aspects of miR-15/16: Possible future cancer therapeuticsâ€ [Gene Rep. 12 (2018) 149â€“164] (Gene Reports (2018) 12 (149â€“164), (S2452014418300748), (10.1016/j.genrep.2018.06.012))	2020	Gene Reports
14	Naushad S.M.; Devi A.R.R.; Hussain T.; Alrokayan S.A.; Ramaiah M.J.; Kutala V.K.	In silico analysis of the structural and functional implications of SLC19A1 R27H polymorphism	2019	Journal of Genetics
15	Naushad S.M.; Rama Devi A.R.; Hussain T.; Alrokayan S.A.; Janaki Ramaiah M.; Kutala V.K.	In silico analysis of the structural and functional implications of SLC19A1 R27H polymorphism	2019	Journal of genetics
16	M. J.R.	Functions and epigenetic aspects of miR-15/16: Possible future cancer therapeutics	2018	Gene Reports
17	Dadmal T.L.; Appalanaidu K.; Kumbhare R.M.; Mondal T.; Ramaiah M.J.; Bhadra M.P.	Synthesis and biological evaluation of triazole and isoxazole-tagged benzothiazole/benzoxazole derivatives as potent cytotoxic agents	2018	New Journal of Chemistry
18	M. J.R.; Vaishnave S.	BMI1 and PTEN are key determinants of breast cancer therapy: A plausible therapeutic target in breast cancer	2018	Gene
19	Mekala J.R.; Naushad S.M.; Ponnusamy L.; Arivazhagan G.; Sakthiprasad V.; Pal-Bhadra M.	Epigenetic regulation of miR-200 as the potential strategy for the therapy against triple-negative breast cancer	2018	Gene