



Md Sarwar Hossain

ABOUT ME

To make the best use of my technical expertise in laboratory experiments, data analysis, data presentation, and manuscript preparation in a research-based career; hence to acquire and apply advanced knowledge in a particular field, "Biological Science".

WORK EXPERIENCE

Researcher (PhD)

University of Parma [01/11/2023 – Current]

City: Parma

Country: Italy

Researcher

Biomedical Sciences Research Center Alexander Fleming, Institute of Molecular Biology and Genetics.

[2018 – 2019]

City: Athens

Country: Greece

Trainee

Aarhus University [2017 – 2018]

City: Aarhus

Country: Denmark

EDUCATION AND TRAINING

PhD

University of Parma [01/11/2023 – Current]

City: Parma

Country: Italy

Website: <https://www.unipr.it/>

Master Degree

State University of Bangladesh [01/2015 – 11/2015]

Address: 138, Dhaka, 1215 Dhaka (Bangladesh)

Website: <https://www.sub.ac.bd/>

Field(s) of study: Pharmacy

Final grade: 3.38 out of 4.00

Master Degree

University of Camerino [01/10/2016 – 14/11/2019]

Address: Via Andrea D'Accorso, 16, 62032 Camerino (Italy)

Website: <https://www.unicam.it/en/home>

Field(s) of study: Biological Sciences

Final grade: 105 out of 110

Thesis: Characteristics of mammary gland in osteoporosis mouse model.

Bachelor Degree

Southeast University [07/2009 – 05/2015]

Address: 251/A Tejgaon I/A, Dhaka, 1208 Dhaka (Bangladesh)

Website: <https://seu.edu.bd/>

Field(s) of study: Pharmacy

Final grade: 3.03 out of 4.00

Thesis: Phytochemical and Pharmacological evaluation of Syngonium podophyllum L. and Xanthosoma sagittifolium L.: Effective medicinal plants.

High School Degree (O Level)

Sitakunda Govt Model High School [2005 – 2006]

Address: Sitakunda, Chittagong, 4310 Chittagong (Bangladesh)

Field(s) of study: Secondary School Certificatre (SSC)

Final grade: 3.49 out of 5.00

LANGUAGE SKILLS

Mother tongue(s): **Bengali**

Other language(s):

English

LISTENING B2 READING B2 WRITING B2

SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2

Italian

LISTENING B1 READING A2 WRITING A2

SPOKEN PRODUCTION A2 SPOKEN INTERACTION A2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

PUBLICATIONS

Estrogen Signaling in Alzheimer's Disease: Molecular Insights and Therapeutic Targets for Alzheimer's Dementia.

[2020]

Estrogens play a crucial physiological function in the brain; however, debates exist concerning the role of estrogens in Alzheimer's disease (AD). Women during pre-, peri-, or menopause periods are more susceptible for developing AD, suggesting the connection of sex factors and a decreased estrogen signaling in AD pathogenesis. Yet, the underlying mechanism of estrogen-mediated neuroprotection is unclarified and is complicated by the existence of estrogen-related factors. Consequently, a deeper analysis of estrogen receptor (ER) expression and estrogen-metabolizing enzymes could interpret the importance of estrogen in age-linked cognitive alterations. Previous studies propose that hormone replacement therapy may attenuate AD onset in postmenopausal women, demonstrating that estrogen signaling is important for the development and progression of AD. For example, ER α exerts neuroprotection against AD by maintaining intracellular signaling cascades and study reported reduced expression of ER α in hippocampal neurons of AD patients. Similarly, reduced expression of ER β in female AD patients has been associated with abnormal function in mitochondria and improved markers of oxidative stress. In this review, we discuss the critical interaction between estrogen signaling and AD. Moreover, we highlight the potential of targeting estrogen-related signaling for therapeutic intervention in AD.

In vitro antioxidant and cholinesterase inhibitory activities of methanolic fruit extract of Phyllanthus acidus

[2015]

Background: Alzheimer's disease (AD) is a progressive neurodegenerative disorder clinically characterized by loss of memory and cognition. Cholinergic deficit and oxidative stress have been implicated in the pathogenesis of AD. Therefore, inhibition of acetylcholinesterase and oxidation are the two promising strategies in the development of drug for AD. *Phyllanthus acidus*, belonging to the family Euphorbiaceae, is a tree and has been used in traditional medicine to treat several pain, inflammatory and oxidative stress related disorders such as rheumatism, bronchitis, asthma, respiratory disorder, also important to promote intellect and enhance memory, thus supporting its possible anti-Alzheimer's properties. In this study, *P. acidus* was evaluated for its cholinesterase inhibitory and antioxidant activities.

Methods: In this study, we evaluated the antioxidant potential and neuroprotective activity of *P. acidus* by assessing total phenol content (FCR assay), total flavonoid content, total antioxidant capacity, Fe³⁺ reducing power capacity, DPPH (2, 2-diphenyl-1-picrylhydrazyl) and hydroxyl radical scavenging capacity, lipid peroxidation inhibition activity & metal chelating activity. In addition acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) inhibitory activities were performed using Ellman's method.

Results: Total phenolic content and total flavonoid content of the extract were 116.98 mg of gallic acid equivalent and 168.24 mg of quercetin equivalent per gm of dried extract. The methanolic extract of *P. acidus* (MEPA) showed considerable total antioxidant activity and reducing capacity. In DPPH scavenging assay and hydroxyl radical scavenging assay, the MEPA showed 84.33 % and 77.21 % scavenging having IC₅₀ of 15.62 and 59.74 µg/ml respectively. In lipid peroxidation inhibition activity MEPA showed moderate inhibition of peroxidation at all concentrations with IC₅₀ value of 471.63 µg/ml and exhibited metal chelating activity with IC₅₀ value 308.67 µg/ml. The MEPA exhibited inhibition of rat brain acetylcholinesterase and human blood butyrylcholinesterase in a dose dependent manner and the IC₅₀ value was found to be 1009.87 µg/ml and 449.51 µg/ml respectively. Conclusion: These results of the present study reveal that MEPA has considerable amount of antioxidant activity as well as anti-acetylcholinesterase and anti-butyrylcholinesterase activity which suggest its effectiveness against Alzheimer's disease and other neurodegenerative disorders.

Phytochemical analysis and antioxidant profile of methanolic extract of seed, pulp and peel of Baccaurea ramiflora Lour.

[2018]

Objective: To analyze the phytochemical constituents responsible for the plausible antioxidant effect of methanolic extract of the seed, pulp and peel of *Baccaurea ramiflora* Lour. Methods:

Fresh seed, pulp, and peel of *Baccaurea ramiflora* fruits were extracted with methanol (MEBRse, MEBRpu, MEBRpe) and evaluated by phytochemical analysis for their content of innumerable metabolites (primary and secondary) viz. carbohydrates, alkaloids, glycosides, tannins, phenols, terpenoids, flavonoids, proteins, and fixed oils. The antioxidant efficacy was assessed through different assay methods viz. 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging activity, total antioxidant capacity (TAC) and reducing power capacity (RPC). Estimation of total phenolic content (TPC), and total flavonoid content (TFC) was also done to confirm the

presence of these phytochemicals. Results: It was revealed from the phytochemical analysis

of MEBRse that alkaloids, glycosides, carbohydrates, phenols, and flavonoids were present, while that of MEBRpu showed the existence of carbohydrates, proteins, alkaloids, glycosides, phenols, saponins, flavonoids, and fixed oils. Presence of carbohydrates, alkaloids, phenols, tannins, flavonoids, and terpenoids were found in the MEBRpe. A significant antioxidant activity was revealed by the MEBRpu [EC₅₀: (27.612 ± 1.375) µg/mL], compared to MEBRpe, and MEBRse in DPPH assay. The ranking order for RPC was MEBRpu > MEBRpe > MEBRse respectively. The EC₅₀ value of TAC of the MEBRpu, MEBRpe, and MEBRse were (25.107 ± 0.744) µg/mL, (241.127 ± 7.463) µg/mL and (372.364 ± 11.030) µg/mL, respectively. Quantity of TPC and TFC were the highest in the MEBRpu (124.360 ± 2.078 mg GAE/g and 107.527

±1.900 mg QRE/g extract) rather than MEBRpe and MEBRse extracts. **Conclusions:** This

study suggests that MEBRpu has a significantly higher antioxidant property than MEBRpe and MEBRse. These extracts might be advantageous in prevention or decelerating the progress of different diseases related to oxidative-stress/damage. Moreover, detailed analysis of these extracts is required to identify the presence of promising compound(s) responsible for their antioxidant activity

Spectrum of Disease and Prescription Pattern for Outpatients with Neurological Disorders: An Empirical Pilot Study in Bangladesh.

[2018]

Background: Neurological disorders represent one of the most prominent causes of morbidity and mortality that adversely affect the lifestyle of patients and a major percentage of these diseases exists in developing countries. Purpose: The objective of this study was to examine the prevalence and prescription pattern for outpatients with neurological disorders in Bangladesh. Methods: The study was conducted on 1,684 patients in 6 hospitals (National Institute of Neurosciences and Hospital, Dhaka Medical College and Hospital, Bangabandhu Sheikh Mujib Medical University, Shaheed Suhrawardy Medical College, Sir Salimullah Medical College, and Apollo Hospitals Dhaka) of the Dhaka City from March 2014 to June 2015. Data were collected through a predesigned questionnaire from the patients that contain information about gender, age, marital status, occupation, residential status, affected disease, self-medicated medicines, and prescribed medicines. Results: Out of 1,684 patients, 28.38% patients were aged 51–60 years and male, 57.19% predominance. The study exposed headache and migraine for 29.75% patients, followed by stroke for 23.93% patients and seizure for 7.07% patients. Genetic reason for the neurological disorders was seen only among 12.35% patients. In this study, 16.98% patients had been affected by neurological disorders for more than 2 years and 19% of patients for less than 6 months. Most extensively prescribed medicines were multivitamins and multiminerals used by 17.89% of patients followed by nonsteroidal anti-inflammatory drugs and other analgesic by 14.84%; afterwards antiulcerants were used by 12.62%, subsequently anticoagulants were used by 11.61% followed by antihyperlipidemic medicines by 10.26% and antiepileptic drugs by 8.08% of patients. The crucial reasons for the selection of prescribed medicines were the confidence that patients had with the physician's prescribed medicines, which was shown for 40.97% patients and knowledge of the medicines was reported for 35.04% patients. The period of prescribed medicine usage was 1–3 months for 39.73% patients and 3–6 months for 29.16% patients. The patient's compliance for prescribed medicines was satisfactory for 34.56% patients, good for 28.15% patients, and side effects were reported for 23.22% patients. Conclusion: In Bangladesh, it is not surprising to note that neurological diseases are more prevalent than other different diseases among different age groups and genders. Headache and migraine, stroke and seizure are most frequently encountered neurological disorders here. Treatment procedure of these disorders is not quite suitable due to the anomalies of health care management systems. Appropriate management of the health care system, especially the placement of hospital and community pharmacy can overcome the existing inconsistencies as well as increase the knowledge, awareness, and perception of the patients about health and neurological disorders.

Exploring the Effect of *Phyllanthus emblica* L. on Cognitive Performance, Brain Antioxidant Markers and Acetylcholinesterase Activity in Rats: Promising Natural Gift for the Mitigation of Alzheimer's Disease.

[2016]

This study was aimed at examining the effect of ethanolic extracts of *Phyllanthus emblica* (EEPE) ripe (EEPEr) and EEPE unripe (EEPEu) fruits on cognitive functions, brain antioxidant enzymes, and acetylcholinesterase (AChE) activity in rat. The effects of EEPEr and EEPEu fruits (i.e., 100 and 200 mg/kg b.w.) were examined in Swiss albino male rats for 12 days and its effect on cognitive functions, brain antioxidant enzymes, and AChE activity determined. Learning and memory enhancing activity of EEPE fruit was examined by using passive avoidance test and rewarded alternation test. Antioxidant potentiality was evaluated by measuring the activity of antioxidant enzymes such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GSH-Px), glutathione reductase, reduced glutathione (GSH), glutathione-S-transferase, and the contents of thiobarbituric acid reactive substances (TBARS) in entire brain tissue homogenates. AChE activity was determined using colorimetric method.

Neuroprotective Effect of *Phyllanthus acidus* L. on Learning and Memory Impairment in Scopolamine-Induced Animal Model of Dementia and Oxidative Stress: Natural Wonder for Regulating the Development and Progression of Alzheimer's Disease.

[2016]

The purpose of this study was to investigate the neuroprotective effect of MEPA on learning and memory impairment in scopolamine-induced rats of dementia and oxidative stress. Treatment with MEPA (i.e., 100 and 200 mg/kg b.w.) was investigated in scopolamine-treated Swiss albino male rats for 14 days and its neuroprotective effects were examined using Elevated Plus Maze (EPM) test, Passive Avoidance (PA) test, Novel Object Recognition (NOR) test, Morris Water Maze (MWM) test as well as the level of antioxidant enzymes such as catalase (CAT), superoxide dismutase (SOD), glutathione reductase (GSR), glutathione-S-transferase (GST), reduced glutathione (GSH), glutathione peroxidase (GSH-Px), lipid peroxidation (TBARS) contents and acetylcholinesterase (AChE) activity in rat brain tissue homogenates.

RECOMMENDATIONS

Professor, Chemical, Life and Environmental Sustainability Sciences, University of Parma, Italy

Name: Dr. Roberto Perris

Phone number: (+39) 0521906601

Email: roberto.perris@unipr.it

Supervisor, PhD research

Associate Professor in Animal Biotechnology, Agricultural University of Athens, Greece

Name: Dr. Douni Eleni

Phone number: (+30) 2105294372

Email: douni@aua.gr

- Supervisor, Master's degree thesis.

Post Doc Position, Biomedical Sciences Research Center 'Alexander Fleming', Athens, Greece.

Name: Dr. Vagelis Rinotas

Phone number: (+30) 2109656310

Email: [rinotas@fleming.gr](mailto:rinas@fleming.gr)

Co-Supervisor, Master's degree thesis.

PROJECTS

Expression of Receptor activator of nuclear factor kappa-B ligand (RANKL) on Mammary gland in Osteoporotic mouse model.

[11/2018 – 03/2019]

Receptor activator of nuclear factor κ B ligand (RANKL), belongs form the family of tumor necrosis factor (Tnf), which plays a very important role in bone remodeling through RANKL/RANK/OPG pathway and have significant importance in mammary gland development. In order to evaluate the role of RANKL in mammary gland development, was evaluated comparison between wild type and transgenic female mice that overexpress huRANKL (TghuRANKL), in different ages and reproductive phases. Molecular analysis was performed by qPCR (quantitative PCR) to measure the relative expression levels of RANKL and RANK that regulation of huRANKL in the mammary gland and the overexpression of RANK in TghuRANKL instead of wild type. Histological staining was evaluated in different ages and reproductive phases to determine the role of RANKL in the morphology of the mammary gland. The results from the histological analysis showed that the area of ductal branches is significantly increased in Tg5519 mice, in all different ages. Together with all findings indicates that RANKL plays a crucial role in the development and proliferation of the mammary gland.

Analysis to rescue spindle formation by Septin9 expression by enriching the mitotic cells in Sept9-emfi del/del cells.

[08/2017 – 02/2018]

Arrest or synchronization of cells at different stages of the cell cycle is a valuable tool for the investigation of the cell cycle and its regulation e. g. the microarray analysis of gene expression, miRNA expression patterns or proteomic analysis of protein modifications. Several non-identical molecules or substance can be used to arrest cell in the different phase. Synchronization in G₁ phase can be achieved with the HMG-CoA reductase inhibitor lovastatin, S phase with a double thymidine block procedure, and G₂ phase with the CDK inhibitor RO3306. Cells can also be enriched in mitosis by treating with monastrol, nocodazole and mechanical shake-off. The release of the cells from this cellular arrest empowers researchers to follow gene expression and other cellular events. In this project, we used monastrol as an agent to specifically arrest cells in mitosis along with the double thymidine arrest. To increase the number of mitotic cells for further investigation of the influence of Septin9 in the spindle we treated with both thymidine and monastrol. The optimal time after the release from monastrol was determined by microscopic analysis of the cells stained for DNA by investigating chromosomal orientation and spindle assembly. The final aim is to enrich the number of mitotic cells in Sept9-emfi^{del/del} cells to easier analyze a possible rescue of spindle formation by Septin9 expression.

HONOURS AND AWARDS

Erasmus Mobility Scholarship

Agricultural University of Athens, Greece [2019]

Erasmus Mobility Scholarship

Aarhus University, Denmark [2018]

ORGANISATIONAL SKILLS

Research related skills

Cell culture, ELISA, Bradford Assay, Flow Cytometry, DNA extraction, RNA extraction, Protein extraction, Western Blot, PCR, qRT-PCR, Cloning, Genotyping, cDNA synthesis, Pyrosequencing, Microtome sectioning, Cryosectioning, Staining (TRAP staining, osmium tetroxide staining, hematoxylin and eosin staining), Semi quantitative PCR, Antioxidants & Reactive Oxygen Species, Chromatography, Natural Product Isolation, Phytochemical Analysis, Compound Isolation, Antibacterial Activity, Pharmacological Screening, Gene Expression, Immunology, Autoimmune Disease.

VOLUNTEERING

President, Southeast University Pharmacy Debaters Association (SUPDA).

[Southeast University, Dhaka]

President, 'MANUSH' (a voluntary blood donor organization) SEU Unit.

[Southeast University, Dhaka]

Executive Member, 'IFP- Initiative for peace' – a voluntary environment welfare organization.

[Dhaka, Bangladesh]

Program Coordinator, Health Sector, 'Udbastu Foundation Bangladesh'

[Bangladesh]

Sub-editor, 'ManushBarta'- a monthly health magazine.

[Dhaka, Bangladesh]