CONFERENCE PROCEEDINGS

NATIONAL SEMINAR ON

"DIABETES – RESEARCH AND REMEDIES"

(NSDRR 2017)

Sponsored by DST - SERB

27th & 28th January, 2017

Organized by

DEPARTMENT OF BIOCHEMISTRY & BIOINFORMATICS

सत्यमेव जयते
Science and Engineering Research Board (SERB)
Department of Science and Technology (DST)
Govt. of India

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Karpagam Academy of Higher Education

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PREAMBLE

India is stated to be the diabetic capital of the world by 2025. In India alone, the prevalence of diabetes is expected to increase from 31.7 million in 2000 to 79.4 million in 2030. Even though type 2 diabetes mellitus is mainly prevalent in adults it currently occurs more often in children and teen agers because of life style changes.

The clinical use of chemotherapeutic agents against diabetes is successful in many cases but suffers from major drawbacks due to various secondary complications leading to loss of vision, amputation, renal failure, heart disease and stroke. This seminar will be an eye opener to the young budding scientists in the field of diabetes research.

The main objective of this seminar is to address two objectives. One is to discuss the experiences of scientist, academicians and scholars on performing research in diabetes that shapes the modern preventive and therapeutic approaches for management of diabetes. Other is to disseminate the latest developments in the field of research and therapeutics.

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Dr. R. VASANTHAKUMAR

Chancellor
Karpagam University
Coimbatore

MESSAGE

It is highly befitting that the Department of Biochemistry and Bioinformatics of our University, which is pursuing very active research in the field of Diabetes, a problem that is growing at an alarming rate which pose great threat to mankind. This National seminar on "Diabetes-Research and Remedies" NSDRR 2017 is aligned with the vision of this University to alleviate people from diseases. I am sure that the interactions during the seminar will bring out new insights and ideas about newer avenues of research. The participation of renowned resource persons from several institutions of repute will no doubt motivate the young research participants. I hope that the deliberations of this academically intense exercise will disseminate to the public, resulting in better health of the layman.

I congratulate the Department for this endeavour and wish the Seminar a grand success.

Chancellor

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Shri. K. MURUGAIAH

Chief Executive Officer
Karpagam Educational Institutions
Coimbatore

MESSAGE

I am happy to note that the Department of Biochemistry and Bioinformatics of our University is organizing an National Seminar On "Diabetes-Research and Remedies" NSDRR 2017.

The scope of the seminar is truly significant because diabetes is not only a health issue but also tacks on the financial resource of the individual. It is estimated that between 5-10% of the population suffer from this disease. This syndrome is a contributing factor in a large percentage of deaths from heart attacks and strokes as well as renal failure and vascular disease. About 90% of the cases of diabetes mellitus fall into Type 2 where obesity plays a major role. Research in the field is wide-spread ranging from causes to treatment. Therefore I call upon the research community to participate in great number in this seminar.

I hope that the deliberations and the research work being presented at the seminar will lead to better understanding and increased interactions between research scholars and scientists. I hope it would open up new avenues for further research. I wish that the outcome of this seminar would benefit the society.

With best wishes to all researchers for their findings.

Chief Executive Officer

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Dr. S. SUDALAIMUTHU

Vice-Chancellor
Karpagam University, Coimbatore

MESSAGE

India is still in the 2nd place with 69.2 million diabetics and these numbers are projected to rise to 123.5 million by 2040. Close to 70% of our people live in rural areas and diabetes is a huge burden to these segments. The days ahead will call for critical thinking and timely action. Our vision must be to implement affordable, accessible, and accountable treatment for diabetes. With an increase in young onset diabetes and cardiovascular risk, our healthcare system and our mindset need to undergo restructuring in order to address the problems of the next generation.

It is a matter of great privilege to welcome the participants to the "National seminar on Diabetes research and remedies". In this era of knowledge explosion, novel concepts & techniques, use of modern medicines and the dynamic changes in the practice of diabetes are seen growing at a very fast pace. This conference will provide an excellent opportunity in this regard not only for exchange of knowledge and experiences of the advances made in the field of diabetes but also for recommending positive measures for their practical application to the prevention and management of this disease in our country.

The organizing committee is making an intensive academic program and I hope all of you will have an exciting time and a useful meeting. I am confident that this conference will generate lot of interest to achieve desired targets of increasing the awareness of diabetes.

I admire the effort, hard work and devotion of entire organizing team members to make this conference a memorable event. I wish all the participants the professionally rewarding days during this conference with very successful scientific sessions.

Vice-Chancellor

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Dr. R. SUNDARARAJAN
Director Academics
Karpagam University, Coimbatore

MESSAGE

On behalf of Karpagam University, I Welcome the participants to the National Seminar On "Diabetes-Research and Remedies" NSDRR 2017 (27 & 28th January 2017) for active deliberations.

Diabetes highlights a growing epidemic imposing serious social economic crisis to the countries around the globe. Despite scientific breakthroughs, better healthcare facilities, and improved literacy rate, the disease continues to burden several sections, especially middle and low income countries. The present trends on the incidence of diabetes indicate the rise in premature death, posing a major threat to global development.

The purpose of this seminar is to bring together researchers and student practitioners to present and discuss novel approaches and solutions as well as recent results in the field of diabetes research and remedies for the effective management. It would also provide a platform to emerge new networks among various participants to exchange ideas and explore new avenues of collaborations

This program includes an exciting collection of contributions resulting from a successful call for papers. The selected papers have been divided into thematic areas, which include both oral presentation and poster presentation and which highlight the current focus of application-specific systems research activities.

We hope that the proceedings will serve as a useful reference for the state-of-the-art application-specific systems diabetic research.

Director Academics

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Dr. G. SEKAR

Registrar
Karpagam University, Coimbatore

MESSAGE

Diabetes mellitus (DM) is a group of metabolic disorders characterized by increased blood glucose associated with many complications and in later stages affect all the vital organs leading to mortality. The aim of the present seminar is to discuss various aspects of diabetes research and remedies. The seminar is also intended to encourage the young research scholars working in the area of diabetes to discuss with eminent scientist in this area. The seminar also emphasize various aspects of diabetes management including planned diet intake, regular exercise and allied management strategies. .

According to World Health Organization (WHO) recently compiled data show that approximately 150 million people have diabetes mellitus worldwide, and that this number may well double by the year 2025 mainly in developing countries like India. Therefore, this seminar will benefit the researchers working on diabetes to formulate effective strategy for the effective management.

This National seminar on diabetes is very timely and would provide a platform to researchers, academicians, students and medical practitioners to share their knowledge about diabetes mellitus and related health care. This national seminar is an opportunity for our life sciences departments to enhance, exchange their interdisciplinary knowledge and extend their network for continuing research successfully in collaboration with other eminent scientists and institutes.

At this juncture I congratulate the department of Biochemistry for organizing this national seminar and wish that the participants will be most benefitted out of this for their research progress.

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Registrar

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Dr. M. PALANISWAMY

Convenor, NSRDD 2017

Dean, Faculty of Arts, Science and Humanities
Karpagam University, Coimbatore

MESSAGE

In recent years, there is reportedly a sharp increase in the number of individuals sufferings with diabetes which has reportedly increased from 19 million in 1995 to 66.8 million in 2015 according to the International Diabetes Federation. These figures are predicted to increase to 123.5 million by 2040. Most of the currently available estimates of diabetes prevalence in India are regional and limited by small sample size. The ICMR-INDIAB (ICMR- India Diabetes [INDIAB]) study (Phase I) reports the weighted prevalence of diabetes (both known and newly diagnosed) in Tamil Nadu was 10.4%, Jharkhand, 5.3%, Chandigarh, 13.6% and Maharashtra, 8.4%. The prevalence of prediabetes was 8.3%, 8.1%, 14.6% and 12.8% in Tamil Nadu, Jharkhand, Chandigarh and Maharashtra respectively. To circumvent this, the scientists working on diabetes need to gather and exchange their ideas, research and nurture the young scientist with their valuable advice. In this regard, I am happy that the Department of Biochemistry under the leadership of Dr. K. Devaki have taken a great initiative to invite the renowned research scientist in the area of diabetes.

I hope the deliberations on this disease during the seminar will pave way for the effective management of diabetes and formulation of effective strategy to combat the disease. I personally wish this event a grand success.

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Convenor. NSRDD 2017

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Dr. J. Anitha, Assistant Professor, Department of Biochemistry, Karpagam University

Dr. L. Hariprasath, Assistant Professor, Department of Biochemistry, Karpagam University

PROGRAMME SCHEDULE

Day 1, January 27, 2017	**Bharathi Hall Sivam Block, I Floor**
09.00 - 10.00 am	**Registration of Delegates**
10.00 - 11.45pm	**Inaugural Session**
Inaugural Agenda	
10.00 am	**Prayer Son**
10.05 am	**Welcome Address** **Dr. K. Devaki,** *Head, Department of Biochemistry*
10.15 am	**Lighting of Lamp by Dignitaries**
10.25 - 10.45 am	**Presidential Address** **Dr. R. Vasanthakumar** *Chancellor, Karpagam University* **Dr.S.Sudalaimuthu** *Vice Chancellor, Karpagam University*
10.45 - 11.20 am	**Inaugural Address:** **Dr. Chandrasekharan Kartha** *Honorary Distinguished Professor,* *Rajiv Gandhi Centre for Biotechnology, Trivandrum, Kerala* **Topic:** Frontiers in Diabetes Research
11.20 - 11.30 am	**Vote of Thanks** **Dr. K. Poornima** *Associate Professor, Department of Biochemistry*
11.30 am to 11.45 am	**Tea Break**

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SCIENTIFIC SESSION I	
11.45 am to 12.20 pm	**Speaker:** **Dr. P. Kalaiselvi** *Assistant Professor, Department of Biochemistry, University of Madras, Chennai* **Topic**: Gymnemic acid, a component of *Gymnema sylvestre* alleviates diabetes by modulating DPP IV mediated beta cell regeneration
12.20 - 1.05 pm	**Oral Presentation Session– I** Chair person: Dr. Chandrasekharan Kartha Co Chair Person: Dr. P. Kalaiselvi
1.05 - 02.00 pm	**Lunch**
SCIENTIFIC SESSION II	
2.00 - 2.35 pm	**Speaker:** **Dr. S. Gayathri Devi** *Associate Professor, Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingham University, Coimbatore.* **Topic**: Nanoformulation in diabetes management.
2.35 - 3.35 pm	**Oral Presentation Session II** Chair person: Dr. S. Gayathri Devi Co chair person: Dr. K. Devaki
3.35 - 3.50 pm	**Tea Break**
3.50 - 5.00 pm	**Oral Presentation Session II cont…** Chair person: Dr. S. Gayathri Devi Co chair person: Dr. K. Devaki

Day 2, January 28, 2017	**Bharathi Hall Sivam Block, I Floor**
SCIENTIFIC SESSION III	
10.00 - 10.40 am	**Speaker:** **Dr.K. Dharmalingham,**

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	Director-Research, Aravind Medical Research Foundation, Madurai **Topic:** Diabetic Retinopathy
10.40 - 11.15 am	**Speaker**: **Dr. S. Ramarajan** *Assistant Professor, Karpagam Faculty of Medical Sciences and Research, Coimbatore* **Topic**: Diabetic Nephropathy
11.15 - 11.30 am	**Tea Break**
11.30 - 1.00 pm	**Oral Presentation Session III** Chairperson: Dr. K. Dharmalingham Cochair person: Dr. K. Poornima
1.05 - 2.00 pm	**Lunch**
SCIENTIFIC SESSION IV	
2.00 - 3.00pm	**Poster Evaluation** **Judges** 1. Dr. J. Anitha 2. Dr. L. Hariprasath
3.00 - 3.30 pm	**Speaker:** **Dr. K. Devaki** *Head, Department of Biochemistry, Karpagam University* **Topic:** Alternative medicine in the management of diabetes
3.30 - 3.50 pm	**Tea**
3.50pm to 4.30 pm	**Valedictory Function**
	Valedictory Agenda
3.50 pm	**Prayer**
4.00 pm	**Welcome** **Dr. M. Sridhar Muthusami**
4.05 pm – 4.20 pm	**Valedictory Address:**

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	Dean, FASH, Karpagam University
4.30 pm – 4.40 pm	**Feedback from Participants**
4.40 pm – 4.50 pm	**Prize distribution**
4.50 pm – 5.00 pm	**Vote of Thanks** **Dr. K. Devaki** *Organizing Secretary, NSDRR 2017*

ABSTRACTS -

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INVITED LECTURES

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IL-03	Gymnemic Acid, a Component of *Gymnema sylvestre* Alleviates Diabetes by Modulating DPP IV Mediated Beta Cell Regeneration	**Dr. P. Kalaiselvi** Department of Medical Biochemistry, Dr. ALMPGIBMS, University of Madras, Chennai – 600 113	17
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IL - 01

Frontiers in Diabetes Research

Dr. Chandrasekaran Kartha

Professor of Eminence, Rajiv Gandhi Center for Biotechnology, Trivandrum, Kerala

Twelve decades have elapsed after Joseph F. von Mering and Oskar Minkowski showed that total pancreatectomy in the dog resulted in diabetes. Eugene Opie in 1901 established the link between the islets of Langerhans and diabetes. Twenty years later, Banting and Best discovered insulin. In recent years, our understanding of diabetes and related disorders has expanded. We now recognize that there are two types of diabetes. We are also aware of the large number of vascular complications of the disease, which are the cause of high mortality in patients with diabetes. The relationship of diabetes with other components of metabolic syndrome is also appreciated. A large number of drugs have been discovered for the treatment of diabetes. In longitudinal studies the beneficial effect of glycemic control to reduce chronic effects of hyperglycemia has been demonstrated. Despite these advances, several issues related to pathogenesis of diabetes remain unclear and strategies to reduce morbidity resulting from diabetes related complications remain to be identified. Some of the hotly pursued topics in diabetes research are (i) defining the genetic basis for type 2 diabetes (ii) understanding the cellular and molecular basis of beta cell dysfunction (iii) discovery of biomarkers for early recognition of the disease and its vascular complications (iv) role of the adipocyte and inflammation in diabetes (v) regenerative therapy for diabetes and (vi) developing technologies for better care of patients with diabetes.

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IL - 02

Microvascular Complications in Diabetes: Diabetic Retinopathy

K. Dharmalingam

Professor, Aravind Medical Research Foundation, Dr. G. Venkitaswamy Eye Research Institute, Aravind Eye Care System, Madurai - 265020.

Diabetes is a global epidemic and the number of people affected increased from 30 million in 1985 to more than 400 million today. In India, 13% of urban population and 7% of rural population suffer from diabetes. Further, unlike the western population, Indians suffer from diabetes at an early age of 40 to 59. This makes the economic loss much more severe for India since working population is afflicted. Among the diabetic complications, macrovascular (diabeticcardivascular) and microvascular (diabtetic retinopathy, nephropathy and neuropathy) complications are of major consequence. In this presentation I will talk about diabetic retinopathy.

To begin with let us look at the retina of the human eye that is affected by DR. Retina is the neurovascular unit, which is responsible for converting light signal into vision. The photoreceptors in the retina receive the light signal and transmit them to brain. The neurovascular unit consists of neuronal cells and microvasculature and DR affects both the components of the neurovascular unit. In fact the neural degeneration begins even before the vascular degeneration. In this talk I will focus on the vascular complications, which lead to permanent vision loss in extreme cases.

DR is a progressive disease with several stages and not all affected persons progress through all stages of the disease. The early stage of disease can be distinguished from late stages by clinically identifiable symptoms such as microaneurisms and vasoregression. This stage is called non-proliferative diabetic retinopathy (NPDR). More advanced disease results in pathogenic neovascularization and hemorrhages and this stage is called proliferative diabetic retinopathy (PDR). Among the diabetic patients 35-40% develop some form of DR and 8-9% develop PDR.

Hyperglycemia is the primary event that is responsive for the development of diabetes and diabetic complications. However, other factors such as genetic, environmental alterations and metabolic changes could also influence the disease progression. Hyperglycemia induced oxidative stress, predominantly orchestrated by mitochondria leads to induction of multiple pathways resulting in diabetic vascular destruction.

We are interested in identifying biomarkers to predict the progression of diabetic patients towards diabetic retinopathy.

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IL - 03

Gymnemic Acid, a Component of *Gymnema sylvestre* Alleviates Diabetes by Modulating DPP IV Mediated Beta Cell Regeneration

Periandavan Kalaiselvi

Assistant Professor, Department of Medical Biochemistry, Dr. ALMPGIBMS, University of Madras,

Chennai – 600 113

Diabetes mellitus, a common metabolic disorder resulting from defects in insulin secretion or action or both, is characterized by hyperglycemia often accompanied by glycosuria, polydypsia, and polyuria. The use of oral drug is limited by adverse side effects including hematological, cutaneous and gastrointestinal reactions, hypoglycemic coma and disturbance of liver and kidney functions and in addition, they are not suitable for use during pregnancy (Aguilara *et al.*, 2000). Hence the quest for search of herbal drugs which has lesser or no side effects is ongoing in India, which is the diabetic capital of the world. A wide array of plant derived active principles representing numerous chemical compounds has demonstrated activity consistent with their possible use in the treatment of NIDDM. Studies in our laboratory have shown that Gymnemic acid - an active component isolated from *Gymnema sylvestre* acts as an anti-obesity and antidiabetic agent by decreasing the body weight and preventing the accumulation of triglycerides in muscle and liver. Gymnemic acid, a saponin contributes for β-cell regeneration and could safeguard the existing beta cells of pancreas and they have the ability to induce insulin secretion by modulating the PI3 kinase /AKT pathway. It is hypothesized that Gymnemic acid activates PI3 kinase mediated cell survival by regulating the levels of GLP-1 via DPP 4 inhibition.

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IL - 04

Management and Treatment of Diabetes mellitus by Nanomedicine

S. Gayathri Devi

Associate Professor, Department of Biochemistry, Biotechnology & Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore.

Diabetes mellitus is a leading non-communicable disease with multiple etiologies, affects more people worldwide and is considered as one of the cause of death. It is a metabolic disorder affecting metabolic pathways of carbohydrate, fat and protein. Longstanding of diabetes can lead to heart, liver, kidney and circulation problems. The intestinal digestive enzymes, α-glucosidase and α-amylase plays a key role in carbohydrate digestion, one main antidiabetic approach is to reduce the post prandial glucose level in blood by inhibition of alpha glucosidase and alpha amylase enzymes. Medicinal plants are considered to be an important source of antidiabetic compounds and the therapeutic benefit of many medicinal plants is often attributed to their hypoglycemic activity. Medicinal plants are the better choice to avoid the side effects of the drugs prepared from synthetic materials and now it is motivated among the public. Nanotechnology involves the production and manipulation materials ranging insize from less than a micron to that of individual atoms. One of the most important criteria of nanotechnology is that of the development of clean, nontoxic and eco friendly green chemistry procedures. Nanoparticles could be further stabilized by coating them with molecules that can be joined together by chemical bonds. Currently, nanotechnology and nanomaterials are fully integrated in common applications and objects that can be used everyday life. Nanoparticles are now considered as a viable alternative to antibiotics and it seems to have a high potential to solve the problem of the emergency, particularly silver nanoparticles have attracted much attention in the scientific field. The nanoparticles synthesized from medicinal plants are cost effective and environment friendly technique for green synthesis of silver nanoparticles. Thus, applications for nanotechnology in the treatment of diabetes mellitus are an entirely new outlook.

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IL - 05

Diabetic Nephropathy

Dr. S. Ramarajan

Assistant Professor, Karpagam Faculty of Medical Sciences and Research, Coimbatore

Diabetic nephropathy is the leading cause of Chronic kidney disease (CKD) and End Stage Renal Disease (ESRD). Albuminuria in individuals with Diabetes mellitus is associated with increased incidence of cardiovascular disease.20-40% of patients with diabetes develop diabetic nephropathy. An annual microalbuminuria measurement is advised in individuals with type1 or type 2 DM. The optimal therapy for diabetic nephropathy is prevention by the control of glycemia. Strict blood pressure control and administration of an ACE inhibitor or ARB slows the progression of diabetic nephropathy.

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IL - 06

Alternative Medicine in Diabetic Treatment

Dr. K. Devaki

Head, Department of Biochemistry, Karpagam University, Coimbatore

Diabetes mellitus (DM) is a metabolic disorder characterized by increased blood glucose levels. This disease is characterized by either lack of insulin production or deficient activity in the presence of normal or even elevated levels of insulin. It is estimated that 183 million people were believed to be unaware of their condition. If no measures taken, the prevalence is projected to rise to 552 million people by 2030, representing around 10% of the global adult population. In addition to medications, such as insulin injections, patients may choose to use complementary and alternative medicine (CAM) to better manage their diabetes. This is seen in common among individual with chronic diseases in developing countries. The rising use of CAM in the management of diabetes is an emerging public health concern given the potential adverse effects, drug interactions and benefits associated with its use. These therapies may aim to treat the mind as well as the body. The commonly used therapies among diabetic patients include herbal medicines, nutritional supplements, diet modifications, spiritual healing and relaxation techniques. My laboratory mainly is focusing to delineate the effect of indigenous herbs that can be used to alleviate DM. We use glucose tolerance test, enzymes involved in carbohydrate metabolism, adiponectin assessment and gene expression studies to assess the efficacy of indigenous herbs. This lecture will explore the commonly used CAM and herbs that are being tested in my laboratory for its antidiabetic activity.

Keywords: Diabetes mellitus, CAM, Traditional medicine

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ABSTRACTS-

ORAL PRESENTATION

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LIST OF ORAL PRESENTATIONS

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OP - 01

Effect of ethanolic extract of leaves of *Boerhavia diffusa* on carbohydrate metabolizing enzymes and hepatic markers in streptozotocin-induced diabetic rats

C.C.S. Vasundhara[1] and S. Gayathri Devi[2]

[1]*Ph.D Scholar, Department of Biochemistry, Biotechnology and Bioinformatics,*

[2]*Associate Professor, Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore – 641 043.*

E-mail: gayathridevi.adu@gmail.com

The present study was formulated to evaluate the effect of *Boerhavia diffusa* by using *in vivo* methods in normal and streptozotocin (STZ)-induced diabetic rats. Diabetes mellitus was induced by single intraperitoneal injection of STZ (60 mg/kg body weight) in male Wistar rats. Various parameters such as carbohydrate metabolizing enzymes, renal and hepatic markers were studied in the normal and diabetes induced rat. The ethanolic extract of leaves of *Boerhavia diffusa* (ELBD) at a dose of 500 mg/kg body weight and glibenclamide, a standard oral hypoglycemic drug at a dose of 10 mg/kg body weight were administered orally to the diabetic induced groups for 45 days. The diabetic-induced groups treated with the ELBD restored the elevated levels of renal and hepatic markers to normal levels. It also altered the activities of carbohydrate metabolizing enzymes to near normal. Thus, from the present study it can be concluded that the ethanolic extract of leaves of *Boerhavia diffusa* possess a favourable antidiabetic effect.

Keywords: *Boerhavia diffusa*, hypoglycemic, glibenclamide, intraperitoneal.

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OP – 02

In vitro anti-diabetic activity of selected edible seeds and green leaves

M. Sowmya priya and A. Sangilimuthu

Department of Biotechnology, Karpagam University, Coimbatore-641 021

E-mail: smuthu.al@gmail.com

Diabetic is the metabolic disorder which is caused due to abnormal secretion of insulin in the pancreatic duct. Among the type 1 and type2 diabetic condition the second one is more severe in the case it could be preventable. In this case controlling plasma glucose level and inhibition of α-amylase and α-glucosidase is essential. Here in this study we concentrate on to inhibit α-amylase and α-glucosidase enzymes using edible seeds and green leaves and their active phytoconstituents. The edible seeds such as fenugreek, chia, flax seeds and the green leaves *Aegle marmelos, Gymnema sylvestre, Murraya koenigii* were used for this study. The fresh juice of *Gymnema sylvestre, Murraya koenigii and Aegle marmelos* leaves contains considerable inhibition of alpha-amylase towards the anti- diabetic's potentials. Comparatively *Gymnema sylvestre* leaves contains more capable to inhibit the alpha amylase compared to *Murraya koenigii and Aegle marmelos* leaves. From the selected leaves nearly 50 phytoconstituents were presents, among that Caryophyllene (33.61%) are being the major compound. Likewise the methanol extract of chia seeds, flax seeds and fenugreek seeds contains considerable inhibition of alpha-amylase, comparatively chia seeds contains more capable to inhibit the alpha amylase enzyme. Nearly 30 phytoconstituents were present in the selected seeds among that propylamine, N,N,2,2-tetramethyl-, N-oxide, Hexadecanoic acid are being the major constituents. This is the primary lead to find the active phytoconstituents as antidiabetic agent for novel drug development from edible seeds and green leaves.

Keywords: Insulin, α-amylase, α-glucosidase *Aegle marmelos, Gymnema sylvestre, Murraya koenigii.*, phytoconstituents, caryophyllene, hexadecaionic acid.

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OP – 03

A comparative study of serum lipid profile and HbA1c in patients with type II diabetes mellitus at Wayanad region

P.B. Desai[1], K.J. Aparnna[2] and R. Venugopal[1]

[1]*Department of Biochemistry, DM Wayanad Institute of Medical Sciences, Naseera Nagar, Meppadi, Wayanad district – 673 577, Kerala*

[2]*Department of Medical Laboratory Technology, Centre for Health Science, University of Calicut, Malappuram district - 673 635, Kerala*

Background: Diabetes represents a spectrum of metabolic disorders, which has become a major health challenge worldwide. Diabetes is pandemic in both developed and developing countries. One of the most common problems in diabetic subjects is atherosclerotic cardiovascular disease which is induced by lipid abnormalities.

Objectives: The aim of the study is to investigate the relationship between glycemic control and serum lipid profile and to evaluate the role of HbA1c as an independent risk factor for cardiovascular diseases in type-2 diabetic subjects. The study also focuses the Dyslipidemia in diabetic people in Wayanad district of Kerala, where the climate throughout the year is wet and cold.

Materials & Methods: The work embodied in the study was carried out in the Department of Biochemistry, DM Wayanad Institute of Medical Science (WIMS), Meppadi, Wayanad, Kerala, during the period of October 2016 to December 2016. Total 100 subjects were included in the study. Subjects were divided into two groups Group A and Group B. Group A consists of 50 non diabetic subjects with HbA1C<6%. Group B consists of 50 diabetic subject with HbA1C>6%. The samples were collected & processed by standard Biochemistry Technique.

Result: The group B subjects with HbA1c value >6% exhibited a significant increase in FBS, TC, LDL-C, TG, HDL-C, TC/HDL-C ratio compared to group A subjects. The HbA1c showed significant positive relationship with TC (r=0.193), TG (r=0.13), HDL-C (r=0.014), LDL-C

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(r=0.073).Female diabetic subjects showed higher mean values for FBG, PPBS, TC, TG, and LDL-C than male diabetic subjects.

Conclusion: The present study suggested that the glycemic control of the patient has got a strong impact on the serum lipid profile levels and atherosclerosis and CVD. Subjects should be educated about regular monitoring of profiles and if found to be abnormal, should control blood glucose and cholesterol very effectively. In our diabetic study clearly added value of HbA1C can be monitoring long term glycemic control and as a potential indicator for dyslipidemia in group B subjects in wayanad region.

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OP – 04

Molecular docking analysis of isolated compounds from ethanolic extract of *Macrotyloma uniflorum* L. leaves in adiponectin receptors

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Adiponectin (encoded by ADIPOQ in humans) is an anti-diabetic adipokine which were reduced in obesity and type 2 diabetes conditions, while the replenishment of adiponectin reportedly ameliorated glucose intolerance and dyslipidaemia. These beneficial effects of adiponectin are likely to be exerted by the activation of AMPK and PPAR-α. AdipoR1 and AdipoR2 are the adiponectin receptors helps to regulate normal glucose metabolism and insulin sensitivity. Therefore AdipoR1 and AdipoR2 serve as receptors for globular and full-length adiponectin and mediate increased AMPK, PPARα ligand activities, fatty-acid oxidation, and glucose uptake by adiponectin. Bioinformatics tools have become very important to pinpoint the targets for different ligands. Docking is a process by which one can predicts the significant orientation of one molecule to a second when bound to each other to form a stable complex. The protein-ligand interaction plays a key role in structural-based drug design. In the present work, nine phyto compounds have been identified from ethanolic extract of the leaves of *M. uniflorum* were docked with AdipoR1 and AdipoR2 receptors. The presence of various bioactive compounds justifies the use of the leaves of the plant for various ailments by traditional practitioners. In this study, docking analyses were done for nine bioactive compounds with the active site residues of Adipo R1 and Adipo R2. Out of 9 compounds, the CPD 6 (Kaempferol triglucoside), CPD 7 (Kaempferol triglucoside), CPD 8 (3-(3,4-dihydroxy-5-(hydroxymethyl) pyrrolidine-2yl) acrylic acid), CPD 9 (2,5-bis(hydroxymethyl)-hexahydro-1H-pyrrolizine-1,2,6,7-tetraol) had exhibited maximum hydrogen bond interactions, least binding energy value, and maximum dock score.

Keywords: *M. uniflorum*, Docking, AdipoR1, AdipoR2

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OP – 05

Alteration in carbohydrate metabolizing enzymes on Streptozotocin induced diabetic rats treated with ethanolic extract of *Erythrina variegata* L. flowers

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Diabetes mellitus is a group of disorder characterized by interruption in carbohydrates, protein and fat metabolism due to complete or relative deficiency of insulin secretion and insulin action. The aim of the present study was to assess the impact of *Erythrina variegata* flowers on alteration of carbohydrate metabolizing enzymes in streptozotocin (STZ) induced diabetic in Wistar albino rats. The animals were divided into six groups. Diabetes was induced by intraperitoneal injection in two consecutive doses of streptozotocin (20 and 25 mg/kg body wt) in Wistar albino rats. Three days after STZ induction, the diabetes rats were treated with ethanolic extract of *E. variegata* flowers orally at the dose of 200 mg/kg body weight daily for 45 days period. Glibenclamide (2mg/kg, orally) was used as standard drug. In addition, changes in body weight, hepatic glycogen content and carbohydrate metabolic enzymes were estimated by standard protocols. The results showed that the ethanolic extract of *E. variegata* flowers significantly increases the body weight, glycogen content and normalize the carbohydrate metabolizing enzymes. From this study, it can be concluded that *E. variegata* flowers possesses considerable anti-diabetic property in streptozotocin induced diabetic rats.

Keywords: *Erythrina variegata* L., Streptozotocin, Glibenclamide, Diabetes

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OP – 06

In vivo antioxidant activities of methanolic extract of *Evolvulus alsinoines* (Linn.)

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Free radicals are reactive molecules involved in many physiological processes and human diseases. Hence, more attention has been directed towards the studies regarding free radical scavenging activity or antioxidant activity of plant extracts. The study was undertaken to assess the antioxidant potential of methanolic extract of *Evolvulus alsinoides* leaves in the paracetamol intoxicated Wistar albino rats. Methanolic extract of leaves in the doses of 75 mg/kg, 150 mg/kg were used in the rats. The oxidative stress was produced by overdose of Paracetamol. The antioxidant parameters including Superoxide dismutase (SOD), Catalase (CAT), Glutathione Peroxidase (GPx), Glutathione-S-transferase (GST) and Lipid peroxidation were evaluated. Silymarin (50 mg/kg) was used as a standard drug for assessment of antioxidant status. Results were analyzed by one-way analysis of variance followed by Student's t-test. When compared with Silymarin, methanolic extract of leaves of *E. alsinoides* did not exhibit potent antioxidant activity in terms of MDA level reduction. However, it significantly increased levels of the antioxidant enzymes (SOD, GPx, GST, and CAT) exerting antioxidant effect in a graded manner. The overall efficacy of the extract is comparable with the standard drug silymarin. The observed results suggest that methanolic extract of leaves of *E. alsinoides* was found to have potential antioxidant activity in the animal model system. This study revealed that the plant *E. alsinoides* can serve as a source of natural antioxidant compounds. The further studies are required to explore the therapeutic property of plant.

Keywords: *Evolvulusalsinoides*, Antioxidants, Lipid peroxidation, Paracetamol

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OP – 07

Analysis of *in vitro* anti-diabetic potential of Passion fruit - *Passiflora ligularis*

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Medicinal plants are important natural sources of molecules with potential antidiabetic effects. Many plant species have been reported to have hypoglycemic effect, which may act through different mechanisms. The present study was designed to open new visions for the development of medicinal uses of Passion fruit. *In vitro* antidiabetic potential of aqueous fruit extract of *Passiflora ligularis* was investigated. The inhibitory effect on carbohydrate digestive enzymes such as α-amylase and α-glucosidase was studied compared to standard Acarbose and glucose uptake by isolated rat hemi-diaphragm. The antidiabetic potential of plant extract was confirmed through the inhibition of α-amylase and α-glucosidase and glucose uptake by rat hemi-diaphragm. These properties of *Passiflora ligularis* could be used in the treatment of type 2- diabetes.

Keywords: *Passiflora ligularis*, α-glucosidase, α-amylase, glucose uptake

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OP – 08

Cystatin C , marker of renal function in diabetic nephropathy

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Diabetes mellitus is the common cause of chronic kidney disease. Serum cystatin C, a small 13 kDa protein is another marker of renal function. Due to its small size Cystatin C is freely filtered at the level of the glomerulus and is re-absorbed and metabolized by the proximal tubular cells. This means the primary determination of blood Cystatin C levels is the rate at which it is filtered at the glomerulus making it an excellent GFR marker. A recent meta-analysis demonstrated that serum Cystatin C is a better marker for GFR in the early stages of CKD than serum creatinine. My aim is to estimate correlation among cystatin C, serum creatinine and serum urea in patients for assessment of early renal failure.200 Subjects were included in this study.100 Diabetic patients and 100 control subjects of both sex. Collected the samples of serumfrom patients with both type 1 and type 2 diabetes who visited our hospital from February 2016 onwards. Cystatin C measurement was carried out using immunoturbidimetric assays. Serum or urinary levels of cystatin C were elevated in diabetic patients compared to non-diabetic controls, including in patients who had no signs indicating nephropathy. Despite the promise of cystatin C as a biomarker, further large, multicenter prospective studies are still needed to confirm its clinical utility as a screening tool for early renal impairment in diabetes in every day practice.

Keywords: cystatin C, biomarker, diabetic nephropathy

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OP – 09

Association between Insulin resistance, Diabetes mellitus and PCOS

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PCOS (Polycystic Ovarian Syndrome) is one of the most frequent endocrinologic dysfunctions in women of reproductive age, characterized by the association of polycystic ovaries, hyperandrogenism and chronic anovulation. Its aetiology remains unknown, but it is clear that hyperinsulinemia secondary to insulin resistance plays an important role in the pathogenesis. In approximately 50-70% of all women with PCOS (Polycystic Ovarian Syndrome) may be found lower or higher degree insulin resistance, while insensitivity to insulin cells very likely contributes hyperandrogenaemia which is responsible for the symptoms and signs of PCOS. The hyperinsulinemia appears to be an important factor in maintaining hyperandrogenemia, acting directly to induce excess androgen production by theca cells and also as a cogonadotropin, augmenting the effect of the increased LH stimulus seen in a majority of women with PCOS. Hyperinsulinaemia also plays an indirect role in hyperandrogenism by inhibiting hepatic sex hormone-binding globulin (SHBG) production, thus increasing free testosterone. In accordance with the high prevalence of insulin resistance, PCOS women are at higher risk of Diabetes Mellitus.

The insulin resistance in at least 50% of PCOS women appears to be related to excessive serine phosphorylation of the insulin receptor. A factor extrinsic to the insulin receptor, presumably a serine/threonine kinase, causes this abnormality and is an example of an important new mechanism for human insulin resistance related to factors controlling insulin receptor signaling. Serine phosphorylation appears to modulate the activity of the key regulatory enzyme of androgen biosynthesis, P450c17. It is thus possible that a single defect produces both the insulin resistance and the hyperandrogenism in some PCOS women. But further research are required to identify the exact mechanism of hyperinsulinemia and associated hyperandrogenism seen in PCOS. Since these patients are at a high risk of diabetes and other metabolic syndrome, identification of the exact mechanism will help to formulate an effective strategy in early diagnosis and treatment of these complications.

Keywords: Hormonal imbalance, PCOS, insulin resistance, Diabetes

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OP – 10

Gymnemic acid safeguards skeletal muscle cells against Type-2 diabetes mediated inflammatory assault in Wistar rats

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Objective:

Diabetes mellitus is a multifactorial chronic metabolic disease characterized by hyperglycemia. Type 2 diabetes is the most common form of diabetes accounting for ~ 90% of diabetic cases and ~ 8% of the total. Skeletal muscle being the predominant site of insulin action is hugely affected by Insulin resistance that results from reductions in glucose transport and phosphorylation and impaired fatty acid metabolism in skeletal muscle. Plants have always been a prototypical source of drugs and many of the formerly available drugs have been derived directly or indirectly from them. Gymnemic acid is the primary active compound in leaves of *Gymnema sylvestre*. In recent studies, gymnemic acid has been demonstrated to be a potent anti-hyperglycaemic and anti-hyperlipidaemic agent. Thus, the present study aimed to investigate the role of gymnemic acid in lessening Type 2 diabetes induced inflammatory derangements.

Research Design and Methods:

Young adult (4 months old) male Wistar albino rats (150-160g) were used for the study and they were grouped into four, Group-1 served as healthy control, Group-2 served as diabetic control, Group-3 served as diabetic control and GA supplemented treatment group and Group-4 served as drug control animals. Animals were induced with Type-2 diabetes by high fat diet and high fructose feeding.

The effect of Gymnemic acid on skeletal muscle cells in T2D in experimental animals was analysed by measuring the levels of free radicals, antioxidants. The effects of gymnemic acid on glycemic profile, lipid profile, and c-peptide and insulin secretion were assessed. Gene expression (RT-PCR) and Protein expression (Western Blotting) of NFκB, TNF-α, iNOS, and Nitrotyrosine were analysed. Cell viability was assessed by histo-pathological study.

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Results:

Gymnemic acid attenuated inflammatory derangements and increased the viability of muscle cells in T2D. Oral administration of gymnemic acid for 30 days in T2D rats significantly lowered plasma glucose, C-peptide and insulin levels. Gymnemic acid increased the levels of enzymic and non-enzymic anti-oxidants and decreased the levels of free radicals respectively. GA decreased the levels of NFκB, TNF-α, iNOS and nitration of tyrosine residues expression in both transcription as well as translational level.

Conclusion:

Gymnemic acid ameliorates the inflammation mediated anomalies that occur in skeletal muscle under T2D via modulating mRNA and protein expression of pro-inflammatory and signalling molecules associated with it. Therefore, Gymnemic acid possess effective anti-inflammatory potential to counteract T2D mediated assault to muscle cells.

Keywords: Gymnemic acid, Type-2 Diabetes and Inflammation

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OP – 11

In vitro preliminary phytochemical screening and free radical scavenging ability of *Drosera indica* L.

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The present study was to explore the preliminary phytochemical screening & free radical scavenging activity of the whole plant *Drosera indica* L .Various concentrations (100 – 500mg/ml) of the ethanol and aqueous extracts of *D. indica* were used in various antioxidant assay methods such as reducing power ,ferric reducing antioxidant power assay (FRAP),nitric oxide (NO) radical, ,2,2' azinobis-3 ethylbenzothiozoline-6 sulfonic acid (ABTS+) radical, hydroxyl radical (OH.), 1,1-diphenyl-2-picryl hydroxyl (DPPH) radical , super oxide radical & hydrogen peroxide (H_2O_2) . In all the assays ascorbic acid was used as the standard antioxidant. Phytochemical screening of plants have revealed the presence of numerous chemicals including flavanoids, tannins , polyphenols, cardiac glycosides &saponins. The ethanolic extract of *D. indica* showed better ability to scavenge ,1,1-diphenyl-2-picryl hydroxyl(DPPH)radical, hydroxyl radical, hydrogen peroxide, nitric oxide radical & Superoxide radical . FRAP & the reducing power abilities increased with increase in concentration of the plant extract. From this study, a conclusion is drawn that *D. indica* can have more beneficial effects with respect to the presence of many active secondary metabolites which may likely to combating oxidative stress diseases like diabetes, cancer, cardio-vascular diseases and in general boost the immune system. The ethanolic extract of *D. indica* showed better ability to scavenge the free radicals. Further studies are needed to evaluate the *in-vivo* antioxidant potential of ethanolic extract of *D. indica* in various animal models.

Keywords : *Drosera indica* L., Free radicals & Antioxidants

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OP – 12

Evaluation of alpha- amylase inhibition and its kinetics by *Momordica charantia extracts*

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Diabetes mellitus is a dreadful disease found in all parts of the world and is becoming a serious threat to mankind health. Lots of chemical agents are available to control and to treat diabetic patients, but total recovery from diabetes has not been reported up to this date. Alternative to these synthetic agents, many herbal plants with hypoglycaemic properties are known from across the world. Bitter gourd (*Momordica charantia*) is an important market vegetable in Tamilnadu. It is also referred to as bitter melon, balsam pear, bitter apple, or wild cucumber. *Momordica charantia* can be considered as an alternative therapy for lowering blood glucose levels in patients with diabetes. In recent years researchers have focused on the antidiabetic effects of bitter gourd. The goals of these studies are to provide safe and clear preparation and dosage recommendations. In the present study alpha amylase inhibitory activity of *M. charantia* fruits and seed extracts was carried out. It was found that ethylacetate extracts showed high % of inhibition (*M. charantia* fruits-92.6 % and seeds-94.2%). Further mechanism of inhibition was studied with different concentrations of starch (0.25, 0.5, 0.75, and 1.0%) and inhibitor (200-800 µg) concentrations and kinetics was studied by method of Dixon Plot and Cornish- Bowden plot. From the nature of graph obtained it was found that lines intersected on the negative side of X-axis and so the type of inhibition was found to be non-competitive inhibition**.** Qualitative and quantitative analysis of extract showed the presence of phenols, flavonoids, terpenoids, tannins and saponins. The presence of major phytochemicals combined with α-amylase inhibitor activity exhibited by these plants shows promising scope in the control of blood glucose by inhibiting digestive salivary and pancreatic amylase in the treatment of diabetes.

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Keywords: Diabetes, α-amylase inhibitor, *Momordica charantia*

OP – 13

Diabetes mellitus – a demoralizing metabolic disorder

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Diabetes mellitus is a combination of heterogeneous disorders commonly presenting with episodes of hyperglycaemia and glucose intolerance, as a result of lack of insulin, defective insulin action, or both. 85 to 95% of all diabetes in high-income countries are of type 2 accounting for an even higher dominance in developing countries. It is intimately associated with improper utilization of insulin by target cells and tissues. It is currently a common and serious health concern globally. According to WHO, this problem has been aggravated by rapid cultural and social dynamics, ageing populations, increasing urbanization, dietary changes, reduced physical activity and other unhealthy lifestyle and behavioural patterns. High blood glucose levels are symptomatic of diabetes mellitus as a consequence of inadequate pancreatic insulin secretion or poor insulin-directed mobilization of glucose by target cells. This review explores diabetes mellitus in terms of its historical perspective, biochemical basis, economic burden, management interventions along with the future perspectives.

Keywords: Insulin, blood glucose levels, islets of langerhans, hyperglycemia

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OP – 14

Diabetes

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Diabetes commonly called diabetes mellitus is a metabolic disease wherein the level of sugar in the blood tends to remain high or because insufficient insulin is produced in the pancreas or because the cells do not respond to insulin produced. There are three main types of diabetes, namely Type 1, Type 2. Type 1 and type 2 were previously known as insulin and without diabetes. In patients with type 1 diabetes, the body is unable to produce insulin and the pump and obrazominsulinovaya be required. In type 2 diabetes, the cells are unable to properly use insulin because the insulin resistance. Patients diagnosed with type 1 must rely on insulin injections for life and must undergo regular tests for levels of glucose in the blood with a special diet to keep blood sugar levels to rise. Type 2, is the most common and widespread form of diabetes in the world. People who are overweight have a higher risk of developing type 2 diabetes risk. Methods of prevention of type 1 diabetes are not very specific as environmental triggers that predispose to the risk of this disease. Type 2 which is mainly associated with obesity can be prevented by regular physical activity. Although prevention is always better, but in the case of diabetes develops in a person, there are mechanisms to heal too. Pancreas transplantation the development of an artificial pancreas and genetic manipulation are the latest advances in research and science which have the possibility of cure.

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OP – 15

Types of diabetes

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A group of diseases that result in too much sugar in the blood, or high blood glucose.

There are commonly **four** types they are

1. Type 1:

- A chronic condition in which the pancreas produces little or no insulin.

  More than 1 million cases per year (India)

- Can't be cured, but treatment may help. Requires a medical diagnosis. Lab tests or imaging always required.
- Chronic: can last for years or be lifelong
- It typically appears in adolescence.
- Symptoms include increased thirst, frequent urination, hunger, fatigue and blurred vision.
- Treatment aims at maintaining normal blood sugar levels through regular monitoring, insulin therapy, diet and exercise.

2. Type 2 :

- A chronic condition that affects the way the body processes blood sugar (glucose).
- More than 10 million cases per year (India)
- Treatable by a medical professional
- Requires a medical diagnosis
- Lab tests or imaging always required
- Chronic: can last for years or be lifelong
- With type 2 diabetes, the body either doesn't produce enough insulin, or it resists insulin.

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- Symptoms include increased thirst, frequent urination, hunger, fatigue and blurred vision. In some cases, there may be no symptoms.
- Treatments include diet, exercise, medication and insulin therapy.

3. Pre-diabetes:

- A condition in which blood sugar is high, but not high enough to be Type 2 diabetes.
- More than 10 million cases per year (India)
- Treatable by a medical professional
- Chronic: can last for years or be lifelong
- Without intervention, it's likely to become type 2 diabetes within 10 years.
- Many people with prediabetes have no symptoms.
- Progression from prediabetes to type 2 diabetes isn't inevitable. With lifestyle changes, weight loss and medications, it's possible to bring a blood sugar level back to normal.

4. Gestational diabetes:

- A form of high blood sugar affecting pregnant women.
- More than 1 million cases per year (India)
- Treatable by a medical professional
- Requires a medical diagnosis
- Those who develop gestational diabetes are at higher risk of developing type 2 diabetes later in life.
- In most cases, there are no symptoms. A blood sugar test during pregnancy is used for diagnosis.

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OP – 16

Synthesis of silver nanopartciles from leaves of *Cipadessa baccifera* and its *in vitro* antidiabetic activity

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Diabetes mellitus is defined as a group of metabolic disorders characterized by high blood glucose levels (hyperglycaemia). It is a chronic metabolic disorder and due to the relative deficiency of insulin secretion and varying degrees of insulin resistance. Currently it has reached epidemic proportion among the challenging unresolved health problems of the 21st century. Worldwide around 230 million people have been affected by diabetes and the numbers are expected to reach around 366 million by 2030. The management of diabetic conditions by insulin therapy has several drawbacks like insulin resistance and in chronic treatment causes anaeroxia nervosa, brain atrophy and fatty liver. Nanotechnology-based approaches hold substantial potential for improving the care of patients with diabetes. Nanoparticles are being developed as imaging contrast agents to assist in the early diagnosis of diabetes. *Cipadessa baccifera* is one such medicinal plant, which was found to have antidiabetic activity. Silver nanoparticles from the leaves of *Cipadessa baccifera* was synthesized and its whose *in vitro* antidiabetic activity was studied and the results were promising.

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OP – 17

PCOS cousin of NIDDM

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Impaired glucose tolerance (IGT), a state characterized by mild elevations in blood glucose levels, typically antedates the onset of NIDDM. However, IGT is under diagnosed, even in populations at high risk, because it is usually asymptomatic and its detection requires an oral glucose tolerance test (OGTT). With appropriate lifestyle or pharmacological intervention, it may be feasible to delay, or possibly prevent, the deterioration from IGT to NIDDM. Thus, great emphasis has been placed recently on earlier detection of IGT. Women with polycystic ovary syndrome (PCOS) are an ideal population in which to identify individuals with IGT for several reasons. In conjunction with the reproductive dysfunction that characterizes the syndrome, PCOS carries an increased risk of development of NIDDM. In addition, PCOS is estimated to affect up to 10% of women of reproductive age, making it one of the most common endocrine disorders in this population. Finally, the manifestations of androgen excess typically bring patients with PCOS to clinical attention early in life, when NIDDM is rarely evident, but when strategies for its prevention may be optimally implemented. While the association between androgen excess and diabetes was first noted some 75 years ago, the precise mechanisms that underlie the pathogenesis of abnormal glucose tolerance in PCOS have yet to be established, and our understanding of the natural history of glucose tolerance among those with the disorder remains incomplete.

Keywords: IGT, OGTT, NIDDM, PCOS, glucose tolerance

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ABSTRACTS -

POSTER PRESENTATION

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LIST OF ORAL PRESENTATIONS

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PP - 01

Relationship between diabetes and obesity

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The relationship between obesity and diabetes is of such interdependence that the term 'diabesity' has been coined. The human obesity is likely to be associated with increased activity of the β-cells of the islets of Langerhans. Obesity is also thought to trigger changes to the body's metabolism. These changes cause adipose tissue to release fat molecules into the blood, which can affect insulin responsive cells and leads to insulin sensitivity. The relationship between overweight and serum immunoreactive insulin becomes more complex when obesity and diabetes coincide. Thus, in obese patients with subclinical diabetes, mild to moderate hyperinsulinemia is usually seen.

Keywords: Obesity, diabetes, β-cells

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PP – 02

Prevention of Diabetes with life style and Nutritional Therapy

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Diabetes is a chronic disease that contributes to a significant portion of the healthcare expenditure for a nation as individuals with diabetes need continuous medical care. In order to prevent or delay the onset of type 2 diabetes, it is necessary to identify high risk populations and introduce behaviour modifications as early as possible. Screening the population to identify high risk individuals is an important task. One of the most accurate tests of diabetes is through the analysis of fasting blood sugar, but it is invasive and costly. Lifestyle therapy is highly effective in achieving therapeutic goals to manage and preventing T2D and improving functionality and quality of life. Lifestyle therapy and weight loss are highly effective in achieving these goals in individuals who are overweight or obese. Patient-focused approaches to lifestyle therapy are described that incorporate evidence-based practices involving diet, physical activity, behavioural interventions, and multidisciplinary care, with demonstrated effectiveness for weight loss. To enhance insulin sensitivity (monounsaturated fatty acids, fiber, and whole grains; represented in Mediterranean diets) and to minimize or avoid foods that promote insulin resistance (saturated fat, *trans*-fat, and refined grains; represented in the typical "Western diet"). However, a low-GI diet with a greater amount of fiber and whole-grain products seemed to improve glycemic and insulin responses and lowered the risk of T2D. Weight loss of 10% is optimal for the prevention of T2D in high-risk patients with prediabetes.

Keywords: T2D, whole grains, Weight loss, Lifestyle therapy, medical care.

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PP – 03

Treatment of diabetes by home remedies

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Diabetes is a group of metabolic disorder in which there are high blood sugar levels over a prolonged period. The prevalence of diabetes is high. World Health Organization (WHO) estimated that 422 million people had diabetes worldwide. The symptoms of diabetes are polydipsia, polyuria, polyphagia. The reasons for diabetes include stress, physical inactivity, family history of diabetes, obesity and consuming junk food. Allopathic medications such as Atorvastatin, Chloropropamide, Exenatide are used. These medications are associated with several disadvantages. It may cause drug resistance during prolonged use of these medicines, and gives us only temporary relief not permanent solution. So, it is preferable to use our traditional home remedies to manage diabetes. Some of the home remedies are bittergourd juice, Fenugreek seeds soaked water, Indian gooseberry juice, Aloe vera gel and Lady's finger water. By following any of these home remedies, we can very well manage and control diabetes. These medications are to be supplemented with regular exercise and healthy life style.

Keywords: Diabetes, Metabolic disorder, high blood sugar level, obesity, Bittergourd juice, Fenugreek seeds.

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PP – 04

Gestational Diabetes

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Gestational Diabetes Mellitus (GDM) occurs in women during pregnancy period. It is a common complication of pregnancy. The prevalence of diabetes is about 15% in pregnant women. The symptoms of GDM include pre-eclampsia, hypertension, hyperandrogenism, depression, over weight and require a caesarean section, because of blood fluctuation low blood sugar or too high. During gestation many of the hormones involved in the foetus development such as estrogen, androgen and thyroid are elevated. These hormones are hyperglycaemic in nature which is the main reason behind gestational diabetes. Insulin is a hormone which promotes the entry of glucose into the cells during gestational diabetes mellitus. The insulin level gets elevated about 1.5 - 2.5 times more than the normal level, which results in insulin resistance. Treatment of GDM includes glynase, diabeta, fortamat and metformin. These are all oral supplementation drugs. It may cause side-effects for child. Prevention of GDM involves our traditional food with green leaves, cereals, pulses, raagi and wheat. The natural medicinal plants treatments can help us to get rid of gestational diabetes.

Keywords: Gestational diabetes mellitus, Insulin, Depression, Green leaves, Natural medicines

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PP – 05

Diabetes mellitus – metabolic disorder

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Diabetes mellitus is the most common endocrine disorder. It arises from insufficiency of insulin production or because the cells do not respond to the insulin that is produced. DM symptoms are polyuria, polydipsia, polyphagia. DM is divided into three types namely: Type 1 DM or insulin dependent diabetes mellitus (IDDM) or juvenile diabetes arises as a result of inadequate production of insulin and the person requires injecting insulin or wearing an insulin pump. Type 2 DM or non insulin dependent diabetes mellitus (NIDDM), in which cells fail to use insulin, with or without absolute insulin deficiency. It is also termed as "adult-onset diabetes". Third type is gestational diabetes which develops during pregnancy but later, either reverts to normal after pregnancy or it may leads to the development of Type 2 DM. DM treatment includes insulin and oral hypoglycemic agents. These drugs either increase insulin production or reduce plasma glucose concentration by increasing glucose uptake by cells and decreasing gluconeogenesis. But, these drugs are not free from side effects such as hypoglycemia, GIT problems, kidney diseases, insulinoma, hepatotoxicity, heart problems. Therefore, this review is to focus on diabetes and its complications, synthetic and herbal treatment or remedies of diabetes.

Keywords: Diabetes, remedies, treatment

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PP – 06

Haematological changes and Atherogenic index of diabetic rats fed with ethanolic extract of fruits of *Terminalia bellirica*

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Diabetes is the most challenging global health problem. It is the ever growing metabolic disorder of industrialized and developing countries. The aim of the present study was to investigate the haematological changes and atherogenic index of diabetic rats administrated with ethanolic extract of fruits of *Terminalia bellirica*. The animals were made diabetic by injection of single dose of STZ (60mg/kg body weight intraperitoneally) in sterile saline. Three days after Stz injection, rats with blood glucose level > 180mg/dl were separated and used for the study. Experimental rats were divided into 4 groups (n=6): Group I: control rats, Group II: diabetic control, Group III: diabetic + 500mg/kg body weight of ethanolic extract of fruits of *Terminalia bellirica* (EFTB) and Group IV: diabetic + 10mg/kg body weight of glibenclamide. The haematological parameters (red and white blood cells) and atherogenic index were evaluated in the diabetic and control rats. The experimental rats treated with ethanolic extract of fruits of *Terminalia bellirica* and glibenclamide showed significantly increased red and white blood cells and atherogenic indices when compared to control rats. The drugs and plant extract treated groups of rats showed increased percentage of protection to cardiovascular disease. It can be concluded that the EFTB possesses antihyperglycemic properties. In addition, the extract can prevent various complications of diabetes and improve some haematological properties. Further experimental investigation is needed to exploit its relevant therapeutic effect to substantiate its ethnomedicinal usage.

Keywords: Streptozotocin, Red Blood Cells, White Blood Cells, Cardiovascular Disease

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PP – 07

The link between diabetes and hormone

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Diabetes begins as a metabolic syndrome that features a combination of hormonal and nutritional imbalances aren't corrected, a pre- diabetic condition can turn into full fledged diabetes. It is characterized by hyperglycemia. Insulin deficiency is identified as a cause factor for the onset of diabetes. In addition, other hormones such as estradiol, thyroid adrenalins, GH and androgens elevate the levels of glucose and could cause diabetes during gestation.

This poster explains about the link between diabetes and various hormones.

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PP – 08

Comparison of Type 1 and Type 2 diabetes mellitus

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Etiology of diabetes:

Diabetes mellitus, a disease in which body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in blood. Etiologically diabetes is classified as type 1 diabetes, type 2 diabetes and gestational diabetes.

Type 1 diabetes:

The more severe form of diabetes is type1 or insulin-dependent diabetes. It's sometimes called "juvenile" diabetes, because type1 diabetes usually develops in children and teenagers though it can develop at any age. In type1 diabetes, the body can't produce enough insulin.

Type 2 diabetes:

Diabetes mellitus type2 (also known as type2 diabetes) is a long term metabolic disorder in which the body cannot use the insulin it produces, that is characterized by high blood sugar.

Gestational diabetes mellitus (GDM):

It is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. The people with GDH is have high degree chance for getting diabetes in the lateral age.

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PP – 09

The effect of dye effluent on early seedling growth of Horse gram (*Macrotyloma uniflorum(lam).*,verdc)

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Macrotyloma uniflorum is known for its anti-diabetic activity. Pollution due to discharge of industrial waste has become a serious problem in most of the area of our country. As dye effluent is an important source of pollutant, the present work was undertaken with an objective to determine its effect on germination, seedling and biochemical parameters of *Macrotyloma uniflorum.* The seeds of horse gram were germinated in 6 different concentration of dye effluent (10%, 25%, 50%, 75% & 100%). The growth parameter such as germination percentage, tolerance index, root length, shoot length, fresh weight, dry weight, total chlorophyll, total protein & starch content were analysed on 13th day of the of the plants. All morphological growth parameters, biochemical contents and yield parameters were found to increase at 10% effluent concentration and it decreased from 25% effluent concentration onwards. The present investigation revealed that the dye effluent is toxic to crop and it can be used for irrigation purpose after proper treatment with appropriate dilutions.

Keywords: Dye effluent, Horse gram, Germination, Growth & Biochemical parameters

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PP – 10

HPLC, UV spectrum analysis of an anti-diabetic polyherbal formulation exerts hepatoprotective activity against CCl_4 induced albino rats

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The objective of this study was to investigate the hepatoprotective activity of ethonolic extract of an anti-diabetic polyherbal formulation (Solanum xanthocarpum, Glycyrrhiza glabra, Ricinus communis, and Phyllanthus niruri leaves) against carbon tetrachloride (CCl4) induced hepatotoxicity. The plants were dried in shade then powdered, extracted with ethanol. Preliminary phytochemical tests were done with the ethanolic extract showed presence of mostly all the compounds. The hepatoprotective activity of the ethonolic extract was assessed in CCl4 induced hepatotoxic albino rats. HPLC and UV spectrum analysis revealed to identify and to quantify each component. The present study that exhibit free radical scavenging properties. DNA damage in liver was also evaluated using Comet assay. The DNA damages and the length are tested, Progression of liver damage induced by CCl_4 in albino rats can be intervened using the polyherbal extract and these effects are comparable to those of silymarin, Polyherbal treatments effectively restored these measurements closer to their normal levels.

Keywords: Anti-diabetic formulation, Hepatoprotection, Hepatotoxicity, CCl4, Sylimerin, Polyherbal drugs.

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PP – 11

Isolation of *Bacillus licheniformis* and purification, production and industrial applications of alkaline protease

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Proteases are very important industrial enzymes and known to exert beneficial effects in alloxan-induced diabetic rats. Proteases contribute about 60% of the total world enzyme market. Besides their use in normal physiology, proteases are used in various industries including pharmaceuticals, detergents, food and waste processing. The most common and widely used bacteria belong to the genus Bacillus.

The aim of the present research work is based upon an extracellular alkaline protease produced by *Bacillus licheniformis*, under optimised conditions. The alkaline protease production was optimized. The optimum day 4 days, pH 8.5; temperature 37°c, were determined.

The enzyme was further partially purified using acetone, followed by dialysis (75 kDa) and sephadox G100 column chromatography. The molecular weight of the enzyme was found by SDS PAGE.

The extracted enzyme was used for hair removal on "goat skin". This property of the enzyme is very useful for application in leather industry.

Keywords: Alkaline Protease, *Bacillus Licheniformis*, Dehairing

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PP – 12

Diabetes

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Approximately 5% of the German population has been diagnosed with diabetes mellitus. About 90% of them suffer from type 2 diabetes, which occurs most frequently in older people. About 5% of diabetes suffers from insulin-dependent type 1 diabetes, with onset mainly in childhood or adolescence. The other forms of diabetes mellitus are rarer. Many people can be expected to have diabetes without knowing it. Whereas severe complications and illness. The symptoms of the diabetes will of two, type one is based on thirst mouth, weight loss etc. Second one is based on blurred vision, frequent urination etc. The reduction of the diabetes will be change the way you cook, carb counting, exercise. Actually diabetes can lead to *amputation, kidney failure* and *cardiovascular disease.* According to statistics by 2025 the number of people with is predicted to reach 5M. Nearly 6.3% of men and 5.3% of women have suffered from diabetes.

Keywords: Amputation, Kidney failure, cardiovascular disease

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PP – 13

Link between diabetes and obesity

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Diabetes is a disorder where the body does not produce insulin, which converts sugar, starches and food into energy. Diabetes occurs when the pancreas does not make enough insulin and the body has higher than normal blood glucose levels. There is a strong correlation between diabetes and obesity and this presentation explain the line between diabetes and obesity.

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PP – 14

Incidence of diabetes mellitus in different states of India – a statistical approach

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Diabetes mellitus (DM) is fast gaining status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease. In 2000, India (31.7 million) topped the world with the highest number of people with DM followed by China (20.8 million) with the United States (17.7 million) in second and third place respectively. Indians are highly susceptible to diabetes due to the genetic factors, diet rich in carbohydrate, obesity and physical inactivity. The current state of DM in different states of India, ICMR found out 0.12 million of diabetes in Chandigarh, 0.96 million in Jharkhand, 9.2 million in Maharashtra, 4.18 million in Tamil Nadu. The national urban survey on diabetes in metropolitan cities of India found out 11.7% in Kolkata, (6.1%) Kashmir valley (11.6%) New Delhi, (9.3%) Mumbai, (13.5%) Chennai, (16.6%) Hyderabad, (12.4%) Bangalore published in Australasian medical journal. Diabetes percent rise to 101 million in India and it will be world's seventh largest killer by 2030 says WHO asks south east nation to focus on control. The times of India reported that the states of Kerala, Tamil Nadu and Gujarat had the highest prevalence of diabetes in India. In 2016 ICMR - INDIAB shows 13.6% of DM and 14.6% of pre diabetes in Chandigarh, 10.4% of diabetes and 8.3% of pre diabetes in Tamil Nadu, 8.4% and 12.8% of diabetes and pre diabetes in Maharashtra, 5.3% and 8.1% of diabetes and pre diabetes in Jharkhand, 9.8% of diabetes in Punjab. 11.9 million of diabetes in 1980 rises to 64.5 million in 2014. The international diabetes federation atlas 2015, estimated 69.2 million Indians are diabetic, which as per the WHO assessment stood at 63 million in the year 2013. These statistics alters us to take necessary initiatives to curb DM.

Keywords: Diabetes, India, statistical approach

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ABOUT THE UNIVERSITY

Karpagam Charity Trust was founded in the year 1989 with the aim of providing excellent educational facilities by imparting practical knowledge and skills to the youth and also catering the needs of the society in general through charitable deeds.

Karpagam Academy of Higher Education has evolved in the year 2008 for the purpose of conferment of Deemed to be University status by Ministry of Human Resource Development, Vide No. F.9.24/2004.U.3 (A) dated 25.08.08.

The University Education, in today's scenario, is witnessing a huge paradigm shift and at Karpagam, we are geared to be a part of that transformation. We ensure that our education epitomizes excellence in every sphere.

Steered by the dynamic spirit of our Chancellor, Dr. R. Vasanthakumar, an eminent industrialist and Philanthropist, Shri. K. Murugaiah, CEO, Dr. S. Sudalaimuthu, Vice Chancellor and Dr. G. Sekar, Registrar, work together to initiate the emergence of excellence.

Our University has been ranked under Elite category for the quality of research (Current Science, 107:3-389-396 2014) in India.

Our Institutions

- Karpagam College of Engineering
- Karpagam Institute of Technology
- Karpagam Polytechnic College
- Karpagam College of Pharmacy
- Karpagam College of Nursing
- Karpagam Faculty of Medical Sciences & Research

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