



## **The Egyptian American Scholars 35th Annual Conference**

**Cooperation Among Scholars  
in Egypt and Abroad**

**Strategies & a Vision for Modern Education**

**27 -29 Dec., 2008**

*Supreme Council of Universities*

## **AEAS MISSION STATEMENT**

*To create a forum for North American Egyptian scholars that facilitates dialogue and promotes partnerships with Egyptian counterparts to implement beneficial scholarly endeavors*

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## AEAS PRESIDENT MESSAGE

On behalf of the Executive Board of the Association of Egyptian American Scholars (AEAS), I welcome you to the 35<sup>th</sup> International, Interdisciplinary Conference. This is made possible through the patronage of His Excellency the Minister of Higher Education, the partnership of the Supreme Council of Egyptian Universities, the hard work of the Conference Committee, the scholarship of many colleagues who prepared papers for presentation, the support of the membership at large and the work many others who took an idea and converted it into a reality. Our appreciation is expressed to all of you.

This conference represents a qualitative step forward in the relationship between scholars in North America and their counterparts in Egypt. In the year 2006, the AEAS incoming board developed a ten point strategic plan that gained immediate acceptance of H.E. Dr. Hany Helal and his colleagues who pledged support of its implementation through joint efforts. Since then each annual conference has adopted a theme representing one of these strategic points and planned in such a manner as to recognize and further the cause of the Ministry of Higher Education's important plan to modernize higher education in Egypt and to increase its value in a global environment. Thus, the theme of this conference: "Cooperation Among Scholars" is an embodiment of this strategy that aims at assuring Egypt of its rightful place in the world through generation after generation of Egyptian scholars who not only are able to benefit Egypt from their partnership with their colleagues from North America, but also able to develop a home grown science and technology that is both Egyptian in nature and global in its competitive value. The authors of the peer reviewed papers presented in the 2008 Cairo Conference illustrate the acceptance of this challenge and the competency of such scholars and their colleagues in various Egyptian institutions of higher education and research centers to achieve this goal.

Formally established in the early seventies, the AEAS represents scholars who are active in various academic and scientific endeavors in the United States and Canada. The AEAS Mission Statement is "To create a forum for North American Egyptian Scholars that facilitates dialogue and promotes partnership with Egyptian counterparts to implement scholarly endeavors". We remain committed to this mission and appreciative of the work of those who laid the foundation. The Cairo Conference is another milestone in our partnership and continued cooperation among scholars for the benefit of humanity. We are most grateful for such an opportunity.

On behalf of the entire membership of the AEAS, I wish the attendees of this conference a most productive and enjoyable meeting.

**Dr. Amer El-Ahraf,  
President,  
Association of Egyptian American Scholars**

## CONFERENCE CHAIR MESSAGE

Dear Conference Delegates

We wish to welcome all of you to the 35th annual conference of the Association of Egyptian American Scholars (AEAS). This conference is promising to be one of the most successful conferences for AEAS with 85 submitted scientific contributions from colleagues in the USA, Canada and Egypt. This conference reflects once again the strong link between Egyptian scholars in North America and their colleagues in Egypt through the tremendous coordinated efforts of the Egyptian Ministry of Higher Education.

This year, a distinguished joint paper review team was composed of scholars from both North America and Egypt. This process has contributed to further enhancement of the fruitful collaboration between AEAS and scientists in Egypt. Also, this year, three pre conference workshops were organized including Management and Leadership; Equivalencies of Higher Education Credentials and E-Learning in Higher Education. These Workshops have shared some expertise from North America with colleagues in Egyptian Universities and research institutions.

Also, this year AEAS was delighted to provide a le 15,000.00 research grant in the name of its late president Dr. Badr El Dine Ali to one of the young distinguished researchers in an Egyptian university or research institution.

We wish to take this opportunity to thank the Supreme Council of Universities, specially its Secretary General Dr. Salwa El Ghareeb for hosting this conference and their valuable and strong support to its success.

We are looking forward to seeing a very active participation and collaboration among scholars inside Egypt and their colleagues in North America

**Dr. Mohamed Attalla, P.Eng.**  
**Conference Chair**  
**Vice President**  
**Association of Egyptian American Scholars**

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## ***ENGINEERING & TECHNOLOGY***

## ECTP; A CHANCE FOR BASIC SCIENCE IN EGYPT

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ECTP, the Egyptian Center for Theoretical Physics, (<http://ectp.mti.edu.eg/>) started its activities just two months ago. It is a unified research and post-graduate teaching center focusing on fundamental physics and applied mathematics. Its mission is to promote research in high energy physics, cosmology, applied mathematics, computational sciences and nuclear reactor physics. ECTP is planning to encompass additional areas including applications. The ECTP's strategic destination is to be an interdisciplinary and self-financing institution for various advanced studies.

ECTP realizes the dream of team-working, integrated efforts and accumulated contributions of individual Egyptian scholars at Egyptian ground. The founder spent many years working at prestigious universities and research centers in Germany and Japan. With ECTP, he is constructing a pilot project, which would give the basic science in Egypt a real chance to bloom.

ECTP is collaborating and willing to intensify joint research projects with leading Egyptian and foreigner scholars and research institutions. The ECTP kindly acknowledges the broadminded support from domestic- and world-leading funding agencies, organizations and individuals.

ECTP basically aims to cultivate new generations of specialists in physics and mathematics committed to and capable of promoting the scientific dimensions and the strategic roles of the higher education institutions, in order to bridge the gap between the best scholarly research and the pressing needs of young generation towards a rapidly changing world (Egypt). The ECTP's research programs are mainly designed to further the professional development of national and international specialists in physics and mathematics.

The current scientific activities at the ECTP cover the particle physics at extreme conditions that might simulate the early universe and compact stellar objects, to the quantum chromo dynamics, quark matter, hadrons computational sciences and nuclear reactors. The breadth and depth of research at the ECTP make it a unique environment for researchers in the region.

## STUDY OF THE BEHAVIOR OF THE HIGH DAM AS DETERMINED FROM THE LEVELING MEASUREMENTS, ASWAN-EGYPT

Abdel-Monem S. M.<sup>1</sup>, Tealeb A.<sup>1</sup>, Mahmoud S. M.<sup>1</sup> and Abdel-Latif M.<sup>2</sup>

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Several leveling lines have been established at different levels along the High Dam during its construction. Two leveling lines are located on the up-stream berm (196 and 186m) and the others are located on the down-stream berm (114, 130, 145, 162, 179 and 196m). Precise leveling measurements were carried out monthly along these leveling lines since 1970. Analyses of the leveling data for the period from 1970 to 2006 were performed in order to study the stability of the High Dam body. The results reveal different tendencies of compaction and settling for the different parts and sections of the High Dam body. High rates of the height changes were recorded during the first five years along the different sections of the High Dam body. The behavior of the different structural units of the High Dam body is very clear from the height changes, especially during the first decade of measurements (1970-1980). During the last decade (1996- 2006), the High Dam body has been moving as one unit. No significant correlations were found between the rates of settling and water level changes at the down-stream side of the High Dam body. However at the up-stream side some correlations were noted between the rates of compaction and the seasonal variations of the water level in the lake. In addition, no significant correlations were found between the rates of settling and the earthquake occurrences in the area



# OPTIMAL INTEGRATION OF EGYPTIAN SOLAR & HYDRO & WIND FARMS TO EUROPE UTILIZING TRANS-MEDITERRANEAN HVDC TRANSMISSION GRIDS

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Due to the limited fossil fuel resources, it is expected that their price continues to rise dramatically in the future. On the other hand climate change obliges humanity to react accordingly. Wind Energy is the favorable alternative to fossil fuels especially in sites with excellent wind energy resources in north Africa such as Gulf of Suez across Red Sea in Egypt and across Atlantic Coast north west of Morocco .

Considering cost reduction potentials which Wind Power still has, it is expected that wind electricity in co-generation with Reverse Osmosis water desalination will be the most economic option within 10-15 years.

If we consider also climate change obliges the humanity to act accordingly then the economy or wind energy becomes more competitive.

During the analysis different factors were considered such as:

Electricity Generation Cost, Land Area Required, Controllability, Availability, Transmission Losses and Security of Electricity Supply.

Using today's High Voltage DC(HVDC) technology to transport the electricity to Europe: the cost of wind electricity would even for the furthest distance in Europe is competitive

.Different paths have been investigated such as Morocco-Spain, Tunisia -Italy and Libya -Italy. At the end Europe gets clean and cheaper electricity ( prices goes down instead of climbing fossil fuel prices),employment due to wind turbines and desalination plants exportation and investing capital instead of burning fossil fuel .

.As for North Africa Wind Electricity and Reverse Osmosis -Desalinated water for social and economic development in addition to selling electricity income and the Environment has less CO2 emission.

## **Key words:**

HVDC – Renewable Energies – Least Cost - Wind Energy – Solar Energy – Desalination.

## REVERSE ENGINEERING FOR IMPORT SUBSTITUTION

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For developing countries, building a strong independent industrial base is a huge challenge. Learning from previous civilizations or more advanced countries has always been the path for nations to develop, catch up and be able to compete worldwide. Using Reverse Engineering techniques to learn how to develop competitive products is the primary process to be able to build an industrial base capable to compete and eventually replace imported products. Industrial strength of nations is primarily measured by the capability to successfully develop, produce and market the precision products needed, not just by the gross output of production for

consumption. This presentation discusses recommendations primarily on the application of Reverse Engineering for Mechanical products, but the need is equally important for Electrical/Electronic and Software engineering.

## PROFILE EFFECT OF INSULATOR ON POSITIVE PRE-DISCHARGE IN UNIFORM FIELD

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Experimental results on the propagation of positive streamer over silicon rubber insulator surface are present. The insulator surface having a curved profile at the middle in a form of a shed is tested. A plane-parallel electrode arrangement is used with positive streamer initiation at a sharp point in the earth anode. The streamer properties of velocity and the propagation probability with the field strength are measured and compared with the corresponding characteristics in absence of insulator. The effect of a shed forming an inhibitor to the streamer progress is to increase the required field for propagation. The propagation velocities across the insulator having a shed were faster to traverse the upper part of the insulator than that of the lower part. The effect of the field at the triple junction has been investigated by moving the insulator away by short distances from the point electrode.

## MOON-MONTH PERIOD AND EPHEMERIS CORRECTIONS

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In previous papers of AEAS Conference of June 2000 [2], May 2004 [3] and Dec, 2005 [4] Moon-Month Ephemeris investigations were proposed to settle corrections of the surprising few non-occurrences of accurate data for the rise and set times of the moon in the last few years. In this paper investigations are made of the moon ephemeris, for the moon-month period, in the last, and the upcoming 9 years. Investigations are also made for the computations of the moon-month period and the ephemeris of the moon during the sun Eclipse, on 29th of March, 2006 and the Eclipse of 1st of August, 2008. Few comprehensively adjusted propositions are made in concern of regulating the moon month calendar, based on observations of practical and ephemeris data.

Analysis of the moon-month period revealed that accuracy for the nominal period of 29.5 days (which support 29 day and 30 day consecutive month periods) indicates an average moon distance at the apogee of 408770 Km and eccentricity of 0.0675. Existing ephemeris oscillates around an average of 29.53 days. This number is established by ancient Egyptians 200 years BC. The ephemeris has periodic oscillations (around this number) with a period of 14 months and peak deviations from the average, changing between  $\pm 0.27$  and  $\pm 0.12$  days in periods of approximately 9 years. At this time (Oct 2008) ephemeris deviation from 29.53 days is +0.1 days. Accurate measurements of the moon distance, which affect these numbers) are still, internationally, in limbo. The daily rise and set delays, for the moon, proved to be effective in predicting the moon epochs. These are computed in different locations, in order to determine if the ephemeris are reliable. The epoch of these formations need, however, practical alignments, as demonstrated in this paper, which proved the errors of some ephemeris.

Analyses are made for the practically observed events, of the sun eclipse of 29th of March, 2006 at Salome, Egypt, and the Eclipse of 1st of August 2008. The 2006 eclipse started around 11:25 AM, before noon and ended 1:50 PM, in the after noon. The time of the complete Eclipse on Salome was 12:37 PM local time. Few discrepancies concerning the epoch during the moon month period (of 27.295 days) are also observed. It is a fact that the computations for the moon ephemeris have minor errors for the noon-moon during its noon time, which is the Eclipse time. Discrepancies exist, with more to the direction of delays for the rise time, and with more to the direction of earlier occurrences for the set times.

More moon rise and set time observations are needed in order to perfect the analytic assumptions and determine more accurately the moon epochs. Radar measurements for the moon distance and citation of its rise and set times, as proposed to National Research Institute of Astronomy and Geophysics (NRIAG), Helwan, Egypt, is ideal for these investigations, especially as the horizon optical observation capabilities are very poor around Cairo.

## ENHANCING THE PERFORMANCE OF THE NUBIA-NASSER LAKE BY SEDIMENT DAMS

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The South of the Eastern Desert in Egypt and the Nubian Desert in the North Eastern Part of Sudan, are located between the Nile and the Red Sea. They form a rocky sandstone plateau cut in many areas with wadis that act as seasonal rivers with an average rainfall of less than 125 mm/year. These wadis usually die before reaching the Nile.

Since the construction of the Aswan High Dam in 1964, Egypt has carried out extensive measurements for deposited sediments in its reservoir which it is annually about 130 million cubic meters of sediments with 85% in Sudan and 15% in Egypt. The results point to continuous accumulation of sediments totalizing more than 6 billion cubic meters (bcm) without much use.

The dredging of these sediments out of the Lake Nasser, followed by pumping in dedicated slurry pipelines would permit the construction of small sediment dams in the desert. These sediments dams can be built in existing canyons or wadis, or using a technique of tailings dam construction over flat surfaces or between sand dunes.

This paper proposes an approach to dredge and pump about 10% of the sediments (i.e. 13 million tons/year) to a dedicated sediment dam. The system would operate 9 months a year, and would pump an average amount of 2000 metric tons/hour of sediments. The sediment dam would be allowed to grow every year on the concept of multiple cells of sediment ponds. A cost of \$3 to \$4 per metric tons of recovered sediments is targeted.

Such an approach would enhance the creation of new communities around desert reclamation, farming, mining or the manufacture of bricks. Dredging and pumping the sediments in dedicated slurry pipelines to the desert also have positive effects on the environment as the depth of the river is rapidly dwindling by siltation in certain areas, with the formation of a new delta at the border between Egypt and Sudan.

# BUDGETING DESIGN COSTS FOR TRANSPORTATION PROJECTS USING PROBABILISTIC ANALYSIS

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Transportation projects are usually designed in three phases. Phase I is the preliminary design report and all its necessary documents, Phase II involves the preparation of the actual construction documents, including plans and specifications, and Phase III involves the construction inspection and project's contract administration. The process of arriving at total person-hours and design costs for Phase II to perform the work is often tedious for both the consultant and the department of transportation (DOT). A major drawback of this process is that the design cost is often reached using heuristic evaluation and without any scientific basis. From the DOT District's viewpoint, consultant's hours often seem inflated with the hopes of getting more hours than required to perform the job, while the consultant thinks the District is being unrealistic. The main objective of this research is to model the design costs on consultant-designed projects. Actual data were collected from The Illinois Department of Transportation (IDOT). Probabilistic modeling techniques were then used to predict the design costs. The models developed will help supplement the current methods of estimating design costs used by IDOT and help provide better estimates. They can also be used as guide for other states' DOTs.

**Key Words:** Design Cost, Transportation Projects, Construction, Probabilistic Analysis, Probability Distribution.

## **INNOVATION AND COLLABORATION IN WASTE SECTOR EDUCATION – THE EDMONTON WASTE MANAGEMENT CENTRE OF EXCELLENCE**

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The City of Edmonton, Alberta, is recognized internationally as a leading innovator in technologies and processes related to waste management. In the late 1990s, that commitment to leadership in the waste sector led to the development of the Edmonton Waste Management Centre of Excellence, a not-for-profit joint venture between public, private and academic members. The Centre promotes research, development and training to enhance scientific and applied knowledge in all areas of waste management and facilitates transfer of knowledge to contribute to the protection of public health, the sustainable use of environmental resources and the quality of life locally and abroad.

The Centre's members are: the City of Edmonton, the University of Alberta, the Alberta Research Council, AMEC Earth and Environmental Ltd., NAIT and EPCOR Water Services Inc. Four key areas of service have been developed at the Centre: research, technology development and verification, advisory services, and training and education programs. The EWMCE draws on its partnerships and applied knowledge base to provide a range of educational services and support to the waste management industry. In line with the conference theme "Cooperation among Scholars in Egypt and Abroad: Strategies and a Vision for Modern Education", this presentation illustrates the Centre's innovative vision for enhancing the education of professionals and practitioners in the area of wastewater treatment operations and biosolids management. This innovative educational initiative can have great impact on Egypt's Engineering and Technology sectors as well as the protection of its public and environmental health.

Two components of the EWMCE give it unique opportunities to provide valuable, practical educational services. The EWMCE operates facilities situated within advanced wastewater and solid waste sites. Also, the Centre is an active partner in research and services that enhance wastewater and solid waste treatment processes. As a result, the EWMCE has access to the latest industry developments and is involved in furthering those developments.

## APPLICATION OF NANOTECHNOLOGY FOR PEST CONTROL

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Integrated pest management system, utilizing traditional chemical, physical, biological controls and crop rotation and methods, is the most accepted technique for pest control in most of the developed and developing countries. Although the technique is successful in depressing pest population and increasing crop yield it still has many environmental and health problems associated with pesticides residues in food and feedstuff and leaching of pesticides to soil, ground water and air.

We are proposing the use of new nanoscale devices with novel properties to make agricultural systems “smart”. For example, the development of devices to identify plant health issues before these become visible to the farmer. Such devices may be capable of responding to different situations by taking appropriate remedial action. If not, they will alert the farmer to the problem. In this way, smart devices will act as both a preventive and an early warning system. Also we are investigating the utilization of nanoclusters to deliver chemicals in a controlled and targeted manner in the same way as nanomedicine has implications for drug delivery in humans. Technologies such as nanoparticles encapsulation and controlled release inclusion complexes that are more effective and more environmentally friendly. A simple and low cost optical sensor, based on porous silicon nanotechnology will be developed for detecting pesticide residue in water and soil.



# **AN ALL PACKET-BASED HYBRID WIRED/WIRELESS BROADBAND ACCESS ARCHITECTURE: AN EVOLUTIONARY PATH TOWARDS THE VISION OF A FIXED-MOBILE CONVERGENCE**

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Recent rapid advances in wired/wireless broadband access technologies including digital subscriber line (xDSL), passive optical network (PON)-based fiber-to-the-curb/home (FTTC/FTTH), ultra mobile broadband (UMB), worldwide interoperability for microwave access (WiMAX) etc., promise seamless all-over access to unlimited information and entertainment to consumers and business users. Among these solutions, PON-based FTTC/FTTH wired solutions remain the most future proof technology for the delivery of broadband services to the users, as they offer higher bandwidths at longer distances. FTTH is the ultimate level of access, allowing end users to access the backbone networks through the gigabit capacity of a fiber optic cable. On the other hand, wireless based access solutions are also very appealing due to their inherent advantage of reduced cost, convenience, portability, and flexibility.

To capture the best features of both of these broadband access technologies, carriers and service providers (SPs) are aggressively seeking a converged network solution that meets the demand for mobility, bandwidth, reliability, security and flexibility. The vision of an integrated networking solution that is capable of delivering to end-users a seamless myriad of services “anytime” and “any where” independent of the access infrastructure is gaining momentum.

The purpose of this talk is to propose a simple and cost effective all packet-based multiservice network architecture that integrates next generation mobile cellular and PON-based broadband access technologies. In addition to delivering traditional PON’s fixed broadband services as well as 3G/4G’s mobile services, the proposed architecture utilizes the existing fiber-based PON access infrastructure to backhaul mobile data traffic across the RAN from individual BSs to the BSC/RNC and vice versa. The proposed Ethernet-based RAN architecture extends the reach of Ethernet access to cellular BSs and provides a scalable mobile backhaul infrastructure that can accommodate the emerging 3G/4G mobile data-centric services along with the diverse QoS and rate requirements set by these services. Utilizing the existing wireline PON infrastructure as a packet-based radio access transport network enables a seamless migration path to fixed-mobile convergence and creates the potential of supporting several powerful and cost-effective packet-based fixed-mobile access architectural models.

## **ADVANCED LITHIUM ION BATTERY TECHNOLOGY FOR HYBRID ELECTRIC VEHICLE (HEV) AND ENERGY STORAGE APPLICATIONS**

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The popularity of Toyota Motor Corp.'s gas-electric hybrid Prius has forced the hand of manufacturers who once regarded the futuristic sedan as a fad. Buyers still wait months to get a \$24,000 Prius, which was Motor Trend magazine's car of the year for 2004 and has become a pop culture icon.

Americans are showing lasting interest in hybrids partly because of concerns about high gas prices and instability in the Middle East. At the same time, Toyota and Honda Motor Co., which builds the Civic Hybrid, have succeeded in winning state and federal tax breaks for people who buy such cars. Also, the IRS has qualified the new Escape Hybrid sport-utility vehicle for a federal tax deduction. Virginia, California and other states in the USA have granted the cars exemptions for driving in high-occupancy-vehicle express lanes.

Despite having been introduced to the world less than 16 years ago, lithium ion (Li-Ion) batteries have already taken over large sectors of the portable battery market. Many of their characteristics make them well suited for different applications. Larger versions have been developed for electric and hybrid electric vehicles (EVs and HEVs) applications, energy storage and utilities applications, and are also qualified for use in satellites, as well as other applications.

## **AN EFFECTIVE AND EFFICIENT METHODOLOGY TO ASSESS THE OUTCOMES OF ENGINEERING PROGRAMS**

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Having an effective assessment process for the outcomes of engineering programs and the continuous program improvement is the theme emphasized by ABET. In this paper, the methodology of assessing the outcomes of the Electrical Engineering and Computer Engineering programs at California State University, Northridge is presented. Through a sequence of tables, the effect of the performance of the students on the assessment of each outcome of the program is not measured by the final grades of the students in each course but is derived from the students' score on each specific homework and exam problems, reports, projects, labs that support that specific outcome. The methodology presented in this paper will produce a quantified figure as a measure for how each outcome is achieved for most of the outcomes of the program. This will help in the discovery of any course or program shortcomings and identifying all areas that need improvement. In this paper, the format of these tables will be presented and the sequence of the steps will be discussed. The analysis of three semesters of data obtained by outcome-specific assessments applied to course related activities using this methodology will also be presented.

The innovated methodology that is presented in this paper makes the process of assessing the outcomes of engineering programs easier and very effective.

# DIGITAL CARTOGRAPHIC DATABASE FOR EGYPTIAN VILLAGES

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## Abstract

There are a lot of surveying data for the Egyptian villages. These data need to be organized and archived in order to be easily accessible.

Digital cartographic database for Egyptian villages has been established using access software. This database contains any surveying data related to Egyptian villages, such as ground control points, photography, digital maps, DEM & orthophoto/ orthoimage and its related metadata also the available utilities in each village. This database helps in the management of cartographic data and also for sustainable development of Egyptian villages.

## Keywords

DBMS- cartography-Digital elevation model- orthophoto/ orthoimage- metadata

## MODIFICATION OF WOOL FABRIC TO IMPROVE ITS DYE ABILITY

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### **Abstract:**

A study of pretreatment of wool fabric with chitosan and some natural constituents of lemon grass oil as citral and nerol has been carried out.

The pretreatments effectively enhanced the dyeing properties of wool fabrics. Pretreatments with chitosan improve the dye ability, color fastness, whiteness and the wet ability. Citral and nerol used as pro-perfumes fabric treatment, surfactant and cleaner to fabrics.

These products are also resistant to laundering, and they are suitable for environmentally friendly treatments of wool fabric.

Chemical and mechanical measurements of the treated samples compared with the untreated one are reported.

**Key words:** Modification, wool, chitosan, citral, nerol, dyeing properties, chemical and mechanical measurements

## HIGH PERFORMANCE REACTIVE DISPERSE DYE-FIXATION ON SILK FABRIC

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Two models of temporarily anionic reactive disperse dyes were prepared via the reaction of 1-[4-( $\beta$ -hydroxy ethylsulphonyl)phenyl]-3-methylpyrazol-5-one with 1-aminobenzene-4- $\beta$ -sulphato ethylsulphone diazonium chloride, having the potential to give mono-and bi-functional sulphatoethylsulphone reactive disperse dyes. These dyes were applied to silk fabric by the exhaust dyeing and screen printing techniques. The effects of varying the dyeing and printing conditions were investigated. The structure of the synthesized dyes were established and confirmed by TLC, elemental analysis and spectral data (IR and <sup>1</sup>H-NMR). Maximum fixation values and color yield of the dyed and printed fabrics were observed at pH 8. The introduction of two temporarily anionic sulphatoethylsulphone groups into the reactive disperse dye molecule was found to promote the fixation and the build up, even at high dye concentration. The fixation and color strength values of the bifunctional sulphatoethylsulphone dye were higher than those obtained with the monofunctional dye on silk fabric. The bifunctional dye fixed effectively to silk with improved application properties being accounted to its highly nonionic reactive bis-vinylsulphone system. By virtue of the characteristic dye structure reactivity, excellent leveling and fastness properties were also obtained.

**Key words:** Sulphatoethylsulphone reactive disperse dyes, Pyrazolone dyes, Dyeing, printing, Silk Fabric.

***MEDICAL SCIENCES & PUBLIC HEALTH***

## AWARENESS OF MANIFESTATIONS AND RISK FACTORS OF CORONARY HEART DISEASE IN PEOPLE AT ABU KHALIFA VILLAGE – ISMAILIA GOVERNORATE, EGYPT

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**Aim:** To reduce patient delays in seeking treatment, the community must become aware that heart attacks need not kill, and even may be avoided, if addressed early.

**Methods:** A cross-sectional descriptive study was carried out at Abu-Khalifa village, Ismailia older than 20 years attending family health center. An interview questionnaire form with scoring system both for the knowledge and attitude were used.

**Results:** Females were (59.3%); 42.3% were illiterate, and 56.9% were either housewives or unemployed (79.7%). Satisfactory knowledge for symptoms of CHD was (88.6%), diagnosis (86.2%), smoking (80.5%), its cessation (95.9%). Only 51.2% was about obesity and diabetes mellitus. Overall, 62.6% had satisfactory knowledge. Positive attitudes towards preventive measures was 92.7% for stress management and 97.6% for smoking cessation. Overall, 95.1% had total positive attitude in females mainly (61.5%), and for negative attitude were males (83.3%),  $p=0.04$ . No statistically significant association could be revealed between knowledge and attitude,  $p>0.05$ . Mean knowledge score was higher among educated,  $74.4\pm21.3$  versus non  $61.5\pm23.0$ , respectively,  $p=0.002$ . Attitude scores were decreasing with age, and higher in females, and housewives or unemployed, and the differences were statistically significant,  $p<0.05$ . Education had a statistically significant positive correlation with knowledge score ( $r=0.24$ ,  $p=0.007$ ). Scores of attitude had statistically significant correlations with age ( $r=-0.27$ ,  $p=0.003$ ), and gender ( $r=0.23$ ,  $p=0.012$ ). Multivariate analysis revealed that education was the only statistically significant independent predictor of knowledge score.

**Conclusion:** Satisfactory knowledge about CHD was acceptable, but lower than attitude. Knowledge was higher among educated. Education was the only statistically significant independent predictor of knowledge score.



## RIGHT VENTRICULAR FUNCTION IN ACTIVE AND ELITE POWER AND ENDURANCE ATHLETES

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**Background and aim:** Abnormalities in right ventricular function may occur in athlete's heart. This study aimed to study the effects of prolonged physical training on right ventricular function by echocardiography.

**Methods:** A cross – sectional comparative study had included active and control subjects in sporting clubs. The study included 30 competitive endurance active and elite male athletes, 30 power active and elite male athletes, and 30 male healthy controls. They were subjected to general clinical examination, electrocardiographic and a complete transthoracic echocardiographic study including standard two-dimensional echocardiographic evaluation (2D-ECHO) of RV size and function. Right ventricular myocardial performance index was calculated (Isovolumic ejection time index = Isovolumic relaxation time ,IRT + Isovolumic contraction time ICT/ Ejection time ET). ).

**Results:** The overall mean age of control group was  $19.3 \pm 1.4$  years, active endurance athletes ,  $20.3 \pm 1.1$  years, for the elite , $29.5 \pm 5.2$  years, for active power athletes, $21.3 \pm 1.0$  years ,for the elite and  $28.6 \pm 3.2$  years. The heart rate was significantly lower in active athletes rather than in the elite athletes and control ( $P > 0.05$ ). There were significant differences between controls and athletes regarding stroke volume (SV) and cardiac output with no significant difference for the ejection fraction. That existed also for both endurance and power active athletes. There were no significant differences among the groups for right ventricular function by myocardial performance index, fractional area change and Eccentricity Index. But E/A ratio was significantly greater in endurance trained athletes than that in power trained athletes.

**Conclusion:** Right ventricular function does not seem to be affected in athletes whether active or elite. These relatively new echocardiographic parameters could be a useful addition to conventional echocardiographic examination

**Key words:** Right ventricular function cardiac structure, **active, elite power and endurance athletes.**

## APOLIPOPROTEIN E POLYMORPHISM AS A RISK FACTOR FOR MYOCARDIAL INFARCTION IN YOUNG EGYPTIAN ADULTS

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**Background:** Apolipoprotein E (apoE) polymorphism has been shown to be important genetic determinants of cardiovascular risk. Its effect on coronary heart disease is less clear, especially in young adults who are at high risk for this disease.

**Subjects and Methods:** The aim of this study was to examine the association of the apoE codon 112 and 158 genotypes in 84 young-aged (< 45 years) Egyptian patients with myocardial infarction. Results were compared with 84 old-aged (> 45 years) Egyptian patients with myocardial infarction. In addition, lipograms were performed on all patients and a detailed history of conventional risk factors and family background was obtained.

**Results:** The most frequently occurring apoE genotype in the two groups was E3/ E3. A significant difference in the E3/ E4 genotype was seen between the two groups. These patients were also likely to have significantly higher low-density lipoprotein (LDL) and lower high-density lipoprotein (HDL) levels.

**Conclusion:** the apoE3/ E4 genotype is strongly associated with the incidence of myocardial infarction in young-aged Egyptians. This genotype also adversely affects LDL and HDL cholesterol levels, both of which contribute to premature atherosclerosis.

**Key words:** Apo E, Myocardial infarction

## MYOCARDIAL PERFORMANCE INDEX IN THE OBESE EGYPTIAN ADOLESCENTS WITH THE METABOLIC SYNDROME

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**Background and aim:** The prevalence and magnitude of adolescent obesity are increasing dramatically. The study tried to assess global cardiac function by using the myocardial perfusion index in a large cohort of adolescents.

**Methods:** A descriptive, cross-sectional study in which, 2250 adolescents, mean age (14 years  $\pm$  1), (1100 male and 1150 females) who attended the outpatient clinic of cardiology accompanying their parents over a period of four years were screened for obesity and MS criteria. Those who met the MS criteria were subjected to careful history taking, anthropometric measures. Laboratory Investigation for lipid profile and blood sugar (FBS and PBS) were assessed. All patients who met the criteria of metabolic syndrome were subjected to full echocardiographic study including right and Left ventricular diastolic & systolic function, and (Tei index = IRT + ICT/ET).

**Results:** Three hundred and fifty one patients (15.6%) had fulfilled the criteria of MS: (152 males, 43%) and (199 females, 57%). Participants with the MS had greater left ventricular (LV) dimension, mass, and relative wall thickness, and left atrial diameter (all  $p < 0.01$ ), and a higher prevalence of LV hypertrophy ( $p < 0.001$ ), with lower ejection fraction ( $p < 0.05$ ) though were in the normal range as well as mitral E/A ratio ( $p < 0.05$ ). Non significant difference between the groups for both the left and right ventricular functions.

**Conclusions:** The adolescent obesity epidemic is a global issue. The prevalence of the metabolic syndrome is high among obese adolescents, and it increases with worsening obesity. The metabolic syndrome is not associated with a global left and right ventricular dysfunction.

## EPIDEMIOLOGIC CHARACTERISTICS OF SONOGRAPHICALLY DETECTED MAJOR CONGENITAL ANOMALIES AMONG EGYPTIAN WOMEN

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**Objectives:** to assess the prevalence of major structural defects detected by ultrasound scan; and explore and classify the possible associations of major anomalies.

**Methodology:** A cross sectional case control study that was carried out in Cairo Fetal Medicine unit at Cairo University in the period from September 2006 till December 2007. A total of 500, 250 cases and 250 controls, were randomly selected and interviewed using a structured questionnaire after full anomaly scan fulfilling the RCOG guidelines. A validate questionnaire was developed to study Socioeconomic level , Maternal age, parity, medical and reproductive history, drug intake, Paternal age, medical history, and environmental and/or occupational exposures. Descriptive analyses were carried out by using SPSS 15 and variables were examined by logistic regression analysis.

**Results:** Mean gestational age at the diagnosis was 27 +/- 5days, and bimodal pattern of 32 and 36 wks in which the highest detection rate was found (7.1%, SD =7.6.). Male to female ratio was 46.2/47.7%, and 6.2% couldn't be determined. CNS anomalies, Urinary tract, and non immune hydrops were the most commonly diagnosed anomalies accounting for 41.5%, 23%, and 13% respectively. Maternal ages ranged from 16 and 41years, with a mean of 25.6 years (SD= 6.08) and paternal mean age was 31.1 yrs (SD= 6.08). First degree consanguinity marriage was present in 33% of major anomalies showing significant association with anomalies; OR 4.64 (CI: 1.01-21.21). Exposure to chemicals in the form of either insecticide or pesticide inhalation was associated with high risk of anomalies P value < 0.01 OR 3.58 (CI: 1.24-10.38).

**Conclusion:** Late gestational age at diagnosis warrants reassessment of antenatal care and health services provided to pregnant women in Egypt, particularly those living in rural areas. Our data support further study of the environmental hazardous exposure especially in Giza, preferably through an outreach national program. Raising awareness against consanguinity and exposure to pollutants among Egyptians should minimize the magnitude of the problem.

## LEPTIN AS A MARKER FOR HEALTH STATUS OF ANIMALS

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Leptin is an adipocyte-derived hormone. Its molecular weight is 16 kDa, protein product of obese (*ob*) gene, consisting of 167 amino acids (AA). It acts as a major regulator of food intake and energy homeostasis. Leptin circulates both as a free and as a protein-bound entity. Leptin is released into the bloodstream in proportion to the amount of body fat and exerts sustained inhibitory effects on food intake while increasing energy expenditure. The biological actions of leptin on target tissues are carried out through interaction with its specific receptors. The leptin receptor gene (*ob-R*) is a member of the family of cytokine receptors which occurs in six receptor isoforms (*ob-Ra* through *ob-Rf*). Leptin is a multifunctional hormone which acts both centrally and peripherally to regulate several metabolic and inflammation-related functions. In addition, Leptin influences satiety, adiposity, and metabolism and is associated with mechanisms regulating puberty onset, fertility, normal embryo implantation and pregnancy, hematopoiesis and immunological processes in various species. There are many factors which regulate adipose tissue (AT) leptin gene expression and leptinemia in sheep, goat, cattle, buffalo and camel such as age, sex, body weight, nutrition status, ration formulation, hormones (Estradiol (E2) - Insulin - glucocorticoids - growth hormone (GH) - insulin-like growth factor-I (IGF-I) - cortisol) and photoperiod. This review included the structure, sources, receptors, methods of its determination in plasma, tissues and milk and biological effects of leptin on the different organs and its relation between nutritional level and health status of animals. Thus, leptin could be considered as a marker for health status of animals.

**Keywords:** Leptin, animals, metabolism, hormones, hematopoiesis, inflammation, immunity, Reproduction.

## SIGNIFICANCE OF MOLECULAR GENETIC ALTERATIONS IN THE PROGNOSIS OF BREAST CANCER

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**Background:** Alterations of several molecular genetic markers in breast cancer; including aneuploidy, altered apoptosis, aberrant expression of p53, HER-2/neu, and Bcl-2, have been associated with breast cancer. Authors determined the importance of molecular genetic factors relative to traditional surgical – pathological factors.

**Materials and Methods:** Ninety – four fresh tissue samples of primary breast carcinoma were studied with flowcytometry for DNA ploidy. On the same specimens, p53, HER-2/neu, Bcl-2 and apoptosis were measured in the nuclear fraction, membrane fraction and cell lysates respectively. Information regarding surgical – pathological factors was obtained.

**Results:** By univariate analysis, histologic grade, tumor stage, lymph-node status, mutant p53, and HER-2/neu were predictive of poor short term prognosis. Using multivariate analysis, tumor stage, lymph-node status, and HER-2/neu were independent factors. Grade sub-group analysis versus time of relapse, revealed a predictive value of Bcl-2 in low-grade tumors while apoptosis was significant in high grade ones.

**Conclusion:** Among the investigated molecular genetic markers, HER-2/neu was the most strongly predictive of poor short term prognosis in breast cancer.

## PATTERNS OF CARDIOVASCULAR METABOLIC SYNDROME IN ISMAILIA, EGYPT

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**Background and aim:** Cardiovascular dysmetabolic syndrome (CDS), dysmetabolic syndrome, syndrome X, DROP syndrome (dyslipidemia, insulin resistance (IR), obesity, and high blood pressure) and IR syndrome are all synonymies for the syndrome characterized by four critical elements: atherogenic dyslipidemia, IR, central obesity, and high blood pressure. The aim of the study was to describe the prevalence and demographical, clinical and laboratory characteristics of patients of cardiovascular dysmetabolic syndrome in Ismailia.

**Methods:** A descriptive, cross-sectional, hospital based study in which, 1250 patients, mean age (52 years  $\pm$  7), (688 men and 562 women) who attended Suez Canal university (SCU) outpatient clinic of cardiology and diabetes were screened for CDS criteria. Those who met the dysmetabolic syndrome criteria were subjected to careful history taking, blood pressure measurement anthropometric measures (Height and weight, body mass index, waist circumference). ECG and Blood samples: (Na and K, Fasting blood sugar (FBS), random blood sugar (RBS), 2 hours post prandial blood sugar (PPBS), fasting plasma insulin (FPI), serum creatinine (S.Cr.) and Lipids were measured. HOMA-IR was assessed according to the level of FBS and FPI (normal values from 5-15  $\mu$ m/ml), which was measured with a dextran-charcoal radioimmunoassay. Serum intact pro-insulin was measured by using a highly specific, 2-site monoclonal antibody-based method.

**Results:** Two-hundred fifty patients (20%) from (1250) had fulfilled the criteria of CDS: (120 men, 18% from the screened 688 men) and (130 women, 23% from the screened 562 women). This means that the overall prevalence of CDS is (20%) among patients attended SCU hospital. One hundred forty five patients of those diagnosed as metabolic syndrome (58%) had the four criteria of CDS (central obesity, hypertension, DM or IGT and dyslipidemia). While (105) patients (42%) had three criteria in the form of (central obesity, hypertension and DM or IGT in 30% of patients) and (central obesity, hypertension and dyslipidemia in 12% of patients). Most of parameters of insulin resistance (IR) were higher in females than males, fasting plasma insulin, PPBS and HOMA-IR :( 26 vs. 21  $\mu$ U/mL), (160.8 vs. 151 mg/dl), and (10 vs. 8.5) respectively, (P value less than 0.05). In addition, waist circumference and BMI were higher in females than males, (125 vs 122 cm) and (42.7 vs 38.8 kg/m<sup>2</sup>) respectively, (P

value less than 0.05).HDL were higher in females than males (43 vs. 39 mg/dl) respectively, with statistical significant difference (P value more than 0.05).Total body obesity (BMI) and central obesity (waist circumference) had a statistically significant direct correlation relation with fasting plasma insulin, HOMA-IR, HDL, TG, FBS and PPBS (P value less than 0.05).Central obesity alone had a statistically significant direct correlation relation with serum uric acid, (P value less than 0.01).Total body obesity (BMI) had a statistically significant direct correlation relation with systolic and diastolic blood pressure (P value less than 0.05).Central obesity (waist circumference) had a statistically significant direct correlation relation with diastolic blood pressure (P value less than 0.05).Patients with family history of DM had higher BMI, waist circumference, FBS, PPBS, fasting plasma insulin, TG and a lower HDL than patients without family history of DM (P value less than 0.05). Also, CDS started at early age in those patients (mean age 47.6 years old  $\pm$  5.4) versus (mean age 52 years old  $\pm$  7) in patients without family history of DM, (P value less than 0.05). Patients with CDS and family history of hypertension had higher BP, BMI, waist circumference, TG and lower HDL than patients without family history of hypertension, (P value less than 0.05).

**Conclusion:** Cardiovascular dysmetabolic syndrome(CDS) is a serious problem affecting(20-24%) worldwide and (19-23%)in Egypt .In our study it was estimated to be 20%.There is a pressing need for a national preventive program to combat obesity, diabetes and related comorbidities by general practitioners and diabetologists

**Key words:** CDS, atherogenic dyslipidemia, IR, central obesity, and hypertension and insulin resistance



## PROGNOSTIC FACTORS THAT CONTRIBUTE TO BREAST CANCER SURVIVAL IN EGYPTIANS

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**Background:** Although, breast cancer rates have decreased in the United States over the last few years, studies suggest that the rate of breast cancer increased from 29% in 2002 to 37.5% in 2006 in Egypt. Very little is still known regarding the features that characterize breast cancer in Egyptian women and whether they differ from women in western countries.

**Aim:** The aim of our research was to conduct a pilot study to compare prognostic factors that affect 6-year survival rates in Egyptian women.

**Methodology:** We enrolled 286 women ages 25-70 with stage I, II or III breast cancer between January 2000 and January 2002 at Ain Shams University hospitals and followed them for six years. All patients underwent breast cancer surgery and were subjected to adjuvant therapy. The following prognostic factors were examined: age, tumor size, tumor grade, and nodal status. Expression of estrogen (ER) and progesterone receptors (PR) were also assessed by immunohistochemistry. T-test, chi-square test and logistical regression statistical analyses were used to assess statistical significance.

**Results:** Only 110 (38.5%) patients completed the 6-year follow-up. A total of 173 patients dropped out of the study for unknown reasons and three patients died after a two three year follow-up. Of the 110 patients, 78 (71%) were disease-free survivors (DFS), 8 (7.3 %) developed local recurrence (LR), and 24 (22%) developed distant metastasis (DM) by the end of the 6-year follow-up. All patients had a mean age of 48.8 years. DFS had a mean age of 47.5 years, and patients with LR or DM had a mean age of 37.5 years and 43.5 years respectively. Accordingly, 65% of DFS were post-menopausal compared

with 12.5% of LR and 37.5 % of DM. Interestingly, grade did not vary among patients with DFS, LR or DM. Forty-seven percent of DFS had tumor sizes greater than 2 cm compared with patients who had LR (100%), or DM (91%). Eighty-two percent of DFS had fewer than four lymph nodes, whereas 75% of patients with LR, and 62.5% with DM had more than four nodes. ER/PR positivity was found in about 60% of patients and the majority (74%) of these were DFS after 6 years. About 42% of patients were ER/PR negative and about 50% of these had LR or DM.

**Conclusion:** Our results suggest that younger age at time of diagnosis, tumor size greater than 2 cm, more than 4 lymph nodes and lack of hormone receptor expression correlated poorly with DFS. Egyptian women are more than a decade younger at time of diagnosis when compared to overall breast cancer statistics. Interestingly younger women were also more likely to develop LR or DM. It is likely that underlying biological differences contribute to the younger age at diagnosis. Further studies characterizing breast cancer in Egypt are required.

## PREVALENCE OF, RISK FACTORS FOR, AND OXIDATIVE STRESS ASSOCIATED WITH *TOXOPLASMA GONDII* ANTIBODIES AMONG ASYMPTOMATIC BLOOD DONORS IN EGYPT

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**Background** : Since existing therapies are not fully effective, and no *Toxoplasma gondii* vaccine is available, efforts to reduce toxoplasmosis transmission are crucial to reducing the impact of this disease.

**Objectives:** To evaluate the seroprevalence of, risk factors for, and oxidative stress associated with *T. gondii* antibodies in asymptomatic blood donors in northeastern Egypt in a cross-sectional study.

**Methods:** From March to September 2007 we recruited 230 blood donors (169 men and 61 women) seen at blood banks, Mansoura University Teaching Hospital, Egypt. We interviewed blood donors about sociodemographic characteristics and potential risk factors for *T. gondii* infection using a structured questionnaire. A venous blood sample was taken to document their *T. gondii* antibody status using enzyme-linked immunosorbent assay (ELISA). Also, serum level of malondialdehyde (MDA) and activity of glutathione peroxidase (GSH-Px) and tocopherol fractions ( $\alpha$ ,  $\gamma$ ,  $\delta$ ) was assessed.

**Results:** Overall, 155 (67.4%) of 230 blood donors were positive for anti-*T. gondii* IgG antibodies and 24 (10.4%) of them were also positive for anti-*T. gondii* IgG avidity antibodies, which is high compared to many countries. Univariate logistic regression analysis showed an association between *T. gondii* seropositivity and area of residence, blood type, older ages, level of education,

history of immune weakness, contact with cats, professional contact with farm animals, agricultural activities, washing hands before meals, eating unwashed vegetables, drinking raw milk, eating cheese made from raw milk, eating luncheon or shawerma. In a multivariate logistic regression analysis, eating luncheon or shawerma (adjusted odds ratio [OR] 80.82 [95% CI 18.62–350.81],  $P < 0.0001$ ) and being non-educated (adjusted OR 32.25 [95% CI 7.46–139.44],  $P < 0.0001$ ) showed a strong significant association with *T. gondii* antibodies. *T. gondii*-seropositive blood donors had significantly ( $P < 0.001$ ) higher MDA level paralleled with significant decrease in the level of GSH-Px ( $P < 0.0188$ ) and tocopherol fractions ( $P < 0.001$ ) compared with *T. gondii* negative blood donors.

**Conclusion:** This study highlights that *T. gondii* is prevalent among healthy blood donors in northeastern Egypt, and that there is a need to introduce *T. gondii* screening in the blood donation scheme.

**KEYWORDS:** Blood transfusion; Health policy; Oxidative stress; Risk factor; Screening; Toxoplasmosis

# DETECTION OF HUMAN TELOMERASE REVERSE TRANSCRIPTASE MESSENGER RNA IN URINE AS A DIAGNOSTIC TOOL FOR URINARY BLADDER CANCER

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**Background:** Bladder cancer is an important national health problem, ranking as the 3<sup>rd</sup> most common malignancy in Egypt. The identification of new molecular markers is one of the most challenging goals for the early detection of bladder cancer since available non-invasive methods have neither sufficient sensitivity nor specificity to be acceptable for routine use. Detection of telomerase enzyme in exfoliated urinary cells is a potentially good candidate. Human telomerase reverse transcriptase (hTERT) catalytic subunit, proved essential for cellular immortality and oncogenesis; hence, its detection provides new cancer diagnostic possibilities.

**Objectives:** This study was undertaken to evaluate the diagnostic efficiency of telomerase in urine compared with voided urine cytology for the detection of malignant cells.

**Methods:** A total of 53 subjects provided a single preoperative morning voided urine sample for hTERT/GAPDH RT-PCR assay and urine cytology. Cystoscopic biopsy was used as the reference standard for identification of bladder cancer. Thirty-nine cases were histologically diagnosed as malignant and 14 had benign urological disorders. Eight healthy volunteers were also enrolled in the study. Semiquantitative analysis using hTERT/GAPDH ratio was performed to set a cut-off point of 0.07AU (using a ROC curve) to discriminate benign from malignant cases.

**Results:** The hTERT/GAPDH RT-PCR assay showed a significantly higher diagnostic sensitivity than cytology (84% Vs. 75%  $p < 0.008$ ) for confirmed UCC, particularly for low grade non-muscle invasive UCC (82% Vs. 64%  $p < 0.005$ ). On combining the two tests a sensitivity of 95% was obtained. A positive hTERT expression was detected in urine samples from 2 patients with previous history of UCC, 4-5 months before cystoscopic evidence of cancer.

**Conclusion:** In this pilot study, hTERT mRNA expression in urine is more sensitive for the diagnosis of bladder cancer than cytology. The combination of urinary hTERT mRNA with cytological testing augments the sensitivity for early non-invasive diagnosis of bladder cancer.

**KEY WORDS:** bladder cancer, telomerase, hTERT RT-PCR, urine cytology.

**Abbreviation:** hTERT, human telomerase reverse transcriptase; SCC, squamous cell carcinoma; UCC, urothelial c

## IMAGE ANALYSIS OF NUCLEAR MORPHOMETRY AND DNA PLOIDY IN COLON ADENOMA AND CARCINOMA

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**Background:** Colorectal cancer the major cause of cancer death and it is believed to have developed from adenoma. Obesity is associated with elevated cancer colon risk and cancer mortality. Animal protein appears to have a strong association with colon cancer, while calcium administration appears to reverse the carcinogenic effect of animal protein on the colon

**Objective:** to investigate the value of computerized morphometry and DNA ploidy in colon adenoma and carcinoma. Aneuploidy has been observed in 33% of lesion known to be precursor of colorectal cancer such as adenoma. It has been suggested that aneuploidy may **predispose to malignancy in these cases.**

**Study design:** The study was performed on 35 cases classified as 15 cases colon adenoma, and 20 cases colon carcinoma. Using Leica Qwinlysis system, nuclear area as a morphological variable, as well as DNA ploidy, DNA index, and proliferation index were measured for each case.

**Results:** A significant difference in mean value of nuclear area was found between benign and malignant lesions, with no statistical differences within the grades of each. Aneuploidy, DNA index (DI) were significantly associated with malignancy and high grade dysplasia. Proliferation index (PI) was significantly higher in malignant lesions, also can differentiate between different grades of carcinoma.

**Conclusion:** Image analysis may become an important test in the initial evaluation of high grade dysplastic patients (adenoma-carcinoma sequence).

**Key words:** colorectal, cancer, morphometry, DNA cytometry, image analysis, DNA ploidy, proliferation index.

## IMPACT OF CLOPIDOGREL USE ON MORTALITY AND MAJOR BLEEDING IN PATIENTS UNDERGOING CORONARY ARTERY BYPASS SURGERY

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**Objective:** This study aimed to evaluate the impact of clopidogrel on mortality and major

bleeding in patients undergoing urgent coronary artery bypass grafting (CABG).

**Background:** Patients who received Clopidogrel prior to CABG are at increased risk of bleeding that must be balanced with the risk of ongoing ischemia if CABG is delayed.

**Methods and Results:** We reviewed 451 consecutive patients who underwent urgent CABG at our institution: 262 never received clopidogrel pre-CABG, whereas 189 received clopidogrel < 5 days pre-operative. The primary endpoint was in-hospital death, massive transfusion or massive blood loss. Patient characteristics were similar between groups, except the incidence of prior MI (71% vs. 46%), NYHA class 3-4 (94% vs. 81%) and prior PCI (22% vs. 13%), were higher in patients receiving clopidogrel. Cardiopulmonary bypass and total operative times were similar between groups. Cross-clamp time was statistically higher in clopidogrel group (97±30 vs. 90±28 min, p=0.02). There was no difference in in-hospital death or massive bleeding indices between groups (clopidogrel: 7% vs. no clopidogrel: 6%, p=0.9). Bleeding indices, renal failure, post-op MI and stroke were not different even after adjusting for the date of stopping clopidogrel pre-CABG. Multivariate regression analysis showed that clopidogrel or the duration it was stopped pre-CABG, did not predict adverse outcomes. Significant independent predictors included preoperative renal dysfunction, hemoglobin level and peripheral vascular disease.

**Conclusion:** Clopidogrel, or the time it was stopped prior to CABG, was not a risk factor for in-hospital death, massive bleeding, or other poor early outcomes in patients undergoing urgent CABG.

## DIABETES IN THE ARAB WORLD

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**Introduction:** Diabetes mellitus is not a new problem; the Ancient Egyptian physician Hesy-ra first described the disease in approximately 3000 B.C. In fact, Ancient Egypt was the first civilization known to have studied medicine extensively, and the earliest written reference to diabetes is attributed to the Upper Egyptian Ebers Papyrus circa 1550 B.C. In modern times, the two most common types of diabetes mellitus have been identified as type 1 (insulin-dependent, or juvenile) and type 2 (insulin-independent, or adult-onset) diabetes mellitus.

**Prevalence:** Both types of diabetes currently affect 246 million people worldwide [International Diabetes Federation, 2007]—projected to include 366 million in 2030 [World Health Organization (WHO), 2000]. This considerable rate of increase will be substantially exceeded in the Middle East, where many of the largest and fastest-growing adult diabetic populations reside in 22 countries with a total population of almost 300 million [Bloomgarden, 2008], including Saudi Arabia, many of the Gulf states, and Egypt. In 2000, 15,188,000 [WHO, 2000] people in the Eastern Mediterranean region were affected with diabetes, with an estimated 42,600,000 [*Ibid.*] people affected in 2030. In Egypt alone, 2,623,000 people are already affected, with the expectation of 6,726,000 [*Ibid.*] in 2030. Because as many as half of all diabetic patients remain undiagnosed, these already sizable figures are likely to be gross underestimations.

**Significance of diabetes mellitus in Middle Eastern society:** Type 1 and type 2 diabetes mellitus are metabolic disorders that derange blood glucose, and lead to considerable health problems. Poor diabetic control and resulting chronic hyperglycemia is strongly associated with long-term dysfunction and eventual failure of multiple organ systems; these devastating complications include cardiovascular disease (coronary heart disease, peripheral arterial disease, cardiomyopathy) as well as diabetic retinopathy, neuropathy, and end-stage renal failure, making diabetes one of the most serious health threats of the modern era.



Obesity, itself a risk factor for the development of cardiovascular complications, is also known to predispose to insulin resistance and diabetes. According to a report published in 1999 [Al-Mahroos, 1999], at least one-third of the Arab population can be categorized as obese. Further, 20% to 38% have hyperlipidemia, and 24% to 46% have hypertension [arabdiabetes.org, 2008; Ibrahim, 1995]. These data, however, present a significant opportunity to reduce the incidence of obesity, and therefore the number of individuals who may potentially develop diabetes, through educational campaigns for lifestyle modification and weight loss that are sensitive to Middle Eastern customs and culture.

It is estimated that approximately twenty years after the onset of diabetic disease, nearly all patients with type 1 diabetes and more than 60% of those with type 2 diabetes will have diabetic retinopathy [American College of Physicians, 1992]. According to these statistics, more than 800,000 Middle Eastern diabetics will require treatment for retinopathy [Ahmed]. Further, diabetic retinopathy is the leading cause of blindness amongst people of working age in industrialized countries [Kohner, 1992]. While data remain too limited to calculate an accurate figure as to the proportion of blindness that directly results from diabetic retinopathy in all populations, it seems likely that blinding diabetic eye disease is now the fourth major cause of blindness worldwide, after cataracts, glaucoma, and trachoma [Thylefors, 1995; McGavin, 1996].

Genitourinary complications also appear to be particularly common among diabetics [Brown, 2005], with 80% reporting lower urinary tract complications, 50% developing nephropathy (kidney dysfunction), and 35-75% having sexual dysfunction [Fedele, 2005; McVary, 2006]. One center study in Saudi Arabia found that in patients admitted for renal dialysis, the incidence of diabetes mellitus as a cause of kidney failure had increased from 4% in the early 1980s to 40.5% in 1999 [Al-Khader, 2001]. Other causes of kidney failure in the Middle East include hypertension, acute renal failure (i.e., mainly due to malaria and renal calculi), chronic interstitial nephritis (inflammation within the kidney tissue), obstructive uropathy (i.e., due to schistosomiasis and renal calculi), hepatitis B and C, tuberculosis, and inherited and congenital kidney diseases [Shaheen, 2005]. While data on the exact prevalence of various renal diseases are very limited, nevertheless, the reported prevalence of chronic renal failure is 80 to 120 per million population (pmp) in the Kingdom of Saudi Arabia, and 225 pmp in Egypt; however, these prevalence rates are likely affected by underreporting [*ibid*]. Overall, high prevalence rates of nephropathy due to any cause have been reported in the Arab world that range from 21.2% in Kuwait [Bloomgarden, 2008] to 35% in Egypt [Shaheen, 2005] and 46.8% in Lebanon [Akel, 1999].

Even among non-diabetics, sexual dysfunction is generally widespread, with 40-45% of adult women and 20-30% of adult men reporting at least one form of sexual dysfunction, including significant interpersonal and psychosocial

consequences. In 2025, it is estimated that as many as 322 million men worldwide will have one of the most common types of male sexual dysfunction, erectile dysfunction [Cummings, 2007; Disanto, 2005]. The Massachusetts Male Aging Study (MMAS) found that erectile dysfunction is three times more common in diabetic men [Chaiban, 2004], and that the manifestation of sexual dysfunction in diabetics was strongly linked to poor glycemic control (HgbA1C levels), duration of disease (more than ten years), and the presence of other diabetic complications (retinopathy, neuropathy, or cardiovascular or microvascular disease) [Heruti, 2004; Rosen, 2005]. While moderate to severe erectile dysfunction symptoms are reported by more than 50% of all men over age seventy, in younger men, erectile dysfunction can also be an early, first sign of either underlying systemic disease, such as diabetes, or psychological issues, like depression [Costa, 2005]; thus, sexual dysfunction represents a major concern in youthful populations, as well, especially due to the fact that erectile dysfunction may present 10-15 years earlier in diabetics than in non-diabetics [Enzlin, 2003; Rowland, 2005]. The risk of erectile dysfunction is made greater by poor lifestyle factors such as obesity and smoking, with the latter having a cumulative dose-dependent effect [Richardson, 2002; Lewis, 2004; Polsky, 2005]. Peyronie's disease is also prevalent among diabetic men being screened for erectile dysfunction, and these patients have a greater risk of severe deformity and erectile dysfunction than non-diabetic men [El-Sakka, 2005; Tefekli, 2006].

While there are no clear risk factors for the occurrence of sexual dysfunction in diabetic women, increased age, poor education, absence of occupation, and menopause appeared to predict sexual dysfunction in non-diabetic female controls [Enzlin, 2003; Errol, 2002; Errol, 2003; Muniyappa, 2005; Nappi, 2005; Bultrini, 2004; Rutherford, 2005; Salonia, 2006]. As the main bulk of research data on sexual dysfunction pertains to male subjects, further research on female sexual dysfunction is greatly needed, especially in the Middle Eastern states.

**Cost of diabetes mellitus to Middle Eastern society:** Recent cost data for diabetic care and complications are extremely sparse for the Middle Eastern region, but due to the epidemic proportions of this disease, they are thought to be significant. One Egyptian study published in 1992 reported that the total direct cost of diabetes in Egypt was estimated at US\$ 74.3 million in 1990, with indirect costs due to absenteeism from work adding an additional US\$ 11.8 million. A Tunisian study in 1994 reported that the total annual cost of medication and outpatient care for diabetes was 2.6 times greater than for people without diabetes (US \$179 versus US \$68, respectively), and that a clear relationship was found between higher costs and the presence of degenerative diabetic complications [International Diabetes Federation].

The economic burden of the treatment of renal failure as the result of diabetes, especially in regards to eventual organ replacement through kidney transplantation, is quite significant to both the health care provider and the

patient [Barsoum, 2003; Jondeby, 2001]. In the Kingdom of Saudi Arabia, the estimated cost incurred per patient per annum for maintenance hemodialysis is US \$19,400. With more than 7200 Saudi patients currently receiving regular dialysis, the total yearly expenditure for hemodialysis approaches an astonishing US \$140 million [Shaheen, 2005]. In Egypt, there are approximately 200 dialysis centers that treat 7000 patients annually [Daar, 1999]. If organ transplantation is required, depending on the specific center and specialists involved in the surgery, the total cost for a living-related kidney transplant procedure ranges between 40,000 and 70,000 LE (Egyptian pounds, i.e. US \$7272–12,727). Conversely, in private settings, a kidney transplant ranges between 80,000 and 90,000 LE (US \$14,545–16,363). Further, the price paid to a commercial living donor for a kidney ranges between 10,000 and 20,000 LE (US \$1818–3636).

To date, four major studies on the cost of diabetes and diabetes care have been published elsewhere in the world, demonstrating that health care expenditures may be up to five times higher for individuals with diabetes compared to individuals without diabetes. On average, patients with diabetes are three times more likely to be hospitalized than non-diabetic individuals [American Diabetic Association, 1993], particularly for heart-related complications. The risk of premature death due to diabetes is significant, with a life expectancy that is, on average, 8 years shorter for diabetic men and women over the age of 50, versus non-diabetic persons [Kannel, Framingham Heart Study, 1979]. Further, U.S. data show that diabetes is the leading cause of blindness, accounts for 40% of all new cases of kidney failure, and carries a risk for leg amputation and heart disease that is 15–40 times higher and two to four times higher than non-diabetic patients, respectively. The International Diabetes Federation reports that the increased risk for foot ulcers associated with diabetes is responsible for 85% of all amputations.

Notably, however, these studies also suggested that while the costs of early, intensive diabetic treatment were greater than traditional treatments, more intensive intervention produced better overall results in preventing further late complications of the disease [Björk, 2001]. Over the past decade, significant events towards the enhancement of solid organ transplantation programs in the Middle East include the formation and consolidation of the Middle East Society for Organ Transplantation and the Arab Society for Nephrology and Renal Transplantation and the increase in the number of transplant units. Ongoing research in transplantation medicine examines the ability to withdraw immunosuppressive drugs, develop novel immunotherapeutic protocols, and the establishment of hematopoietic chimerism (coexistence of transplanted donor and recipient bone marrow) in order to maintain the best quality of life for transplanted patients. While solid organ transplantation represents one of the most technologically advanced medical procedures available today, however, prevention remains the best strategic plan for major organ failure.

**Current and future advances in the treatment of diabetes mellitus in the Arab world:** Since the discovery of insulin in 1922, there have been many major advances in the available methods of treatment for diabetes, including the development of novel pharmaceutical agents, automated/continuous home glucose monitoring and insulin infusion systems, vaccination trials, and cellular and gene therapies. Some of the most promising areas of research focus on the establishment of an “artificial pancreas” (closed-loop system) and the improvement of pancreatic islet cell transplantation techniques, which both bear the potential for the achievement of independence from insulin injections, and alleviation of the devastating long-term complications of diabetes. Recent studies have suggested that with proper intervention, the insulin resistance underlying the development of type 2 diabetes can be reduced; consequently, the onset and complications of disease can be delayed or even prevented. Additional evidence suggests that in the future, even the autoimmunity responsible for type 1 diabetes can likely be circumvented. The success of these endeavors may also have far-reaching applications as a therapeutic model for many other autoimmune and non-autoimmune degenerative diseases, such as lupus, rheumatoid arthritis, Parkinson’s disease, and Alzheimer’s disease.

Updated and projected diabetic health statistics for the populations of Middle Eastern countries are strongly needed, such as the delineation of epidemiologic factors leading to the increased risk of diabetes mellitus specifically in the Middle East, the rates of diabetic complications and co-morbid diseases, the impact on the health of the adult workforce and national productivity, the costs of care, and measures to gauge treatment success. With these data, progress can be made towards the development and advancement of strategies that will provide specific, effective therapeutic and preventive interventions for diabetic patients. For example, the successful implementation of the full spectrum of currently available world-class, cutting-edge treatment modalities for diabetes as described above also would require the establishment of local expertise in the basic and applied science of diabetes, so that continuous refinement and adaptation of this state-of-the-art technology to regional patient needs could be attained, such as the development of culturally acceptable educational programs focused on the prevention and delay of diabetes and its complications via behavior modification, exercise, diet, and weight management in both school-age and urban adult populations, and the widespread distribution of diabetic supplies, including the latest oral and injectable medications and advanced home glucose monitoring systems. Thus, major strides will be made towards overcoming the epidemic of diabetes in the Arab world.

## UPDATE ON THE TREATMENT OF TYPE 1 DIABETES MELLITUS: CELL THERAPY AND BEYOND

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**Introduction:** Type 1 diabetes (T1D) is an autoimmune disease characterized by the permanent destruction of insulin-producing islet (beta) cells in the pancreas, resulting in insulin deficiency. While many T1D patients have been successfully managed with intensive insulin therapy consisting of multiple daily insulin injections and fastidious blood glucose monitoring, insulin administration remains problematic for some individuals. In particular, patients with brittle diabetes exhibit large fluctuations in blood glucose levels, and are more susceptible to severe hypoglycemic episodes that may lead to coma and death.

**Pancreatic islet cell transplantation:** Several additional avenues of research are being explored to improve the success of clinical treatment for T1D. One of the most promising areas of study focuses on pancreatic islet cell transplantation, which is attractive due to its potential for the achievement of insulin independence without the risks associated with whole pancreas transplants. The concept of pancreatic islet cell transplantation for the treatment of T1D as a superior, more physiologic alternative to exogenous insulin administration, however, is not a new one. In fact, the first attempt to graft pancreatic tissue in order to save the lives of T1D patients actually preceded the discovery of insulin by almost thirty years; however, the first successful human islet allotransplantation resulting in long-term reversal of diabetes did not occur until 1990, at the University of Pittsburgh. Yet, despite continued procedural improvements throughout that decade, only about 10% of islet recipients were able to achieve euglycemia.

**Edmonton protocol:** The advent of the Edmonton protocol [Shapiro et al., 2000], which used a large transplanted mass of islets (>11,000/kg patient weight) in conjunction with a glucocorticoid-free immunosuppressive regimen consisting of sirolimus, tacrolimus, and daclizumab [*ibid.*], represented the first major clinical breakthrough in the islet transplantation field. Seven out of seven patients who received either two or three total islet transplantations were able to achieve immediate independence from insulin post-transplant. Encouragingly, in the initial 15-month follow-up period, all patients demonstrated normal HBA1c values, a significantly decreased mean amplitude of glycemic excursion, and no further hypoglycemic episodes.

An extended five-year study [Ryan et al., 2005], however, followed 65 patients transplanted under the Edmonton protocol. The median length of insulin

independence from the time of transplant was 15 months; good graft function was correlated with improved mean HbA1C levels (6.4%-6.7%), versus patients with poor or no graft function (9%). At the close of the study period, only 80% of the participants had demonstrable C-peptide levels, and just 10% remained insulin-independent.

Efforts were made by the Immune Tolerance Network (ITN) at nine international sites (Shapiro et al., 2006) to replicate the remarkable results of the Edmonton protocol, but the findings have not been as satisfactory, with 76% of patients requiring insulin at the end of two years. Data from the Collaborative Islet Transplant Registry (CITR) at North American and European medical centers that performed at least one islet transplant [CITR Executive Summary, 2007] noted that after three years, 16% of patients remained insulin-independent, 28% were insulin-dependent with detectable C-peptide levels, and 32% had no demonstrable C-peptide; 23% of these patients had missing/incomplete data. A higher percentage of successful islet transplantation and persistent islet function subsequently observed in a study by City of Hope was attributed to multiple factors, including vigilant follow-up of patients and the use of Etanercept and high-dose Sirolimus [Al-Sayed et al., 2007].

The Clinical Islet Transplantation (CIT) Consortium, a network of eight international institutions organized under five NIH-approved clinical trials (<http://www.citisetstudy.org>), has recently initiated a very large-scale study of transplanted patients in order to analyze, as well as improve, the outcomes of islet cell transplantation. No results have been reported to date.

**Beyond islet cell transplantation:** While the concept of islet transplantation continues to represent a promising strategy for the treatment of T1D, several practical challenges prevent its widespread clinical application [Balamurugan et al., 2006]. The most significant of these problems is the lack of long-term islet transplant function. Factors likely contributing to these poor outcomes include those of chronic, low-grade alloimmunity (graft rejection), recurrence of autoimmune destruction of islets, exhaustion of islets transplanted into the portal circulation due to high intrahepatic glucose milieu, and inadequate numbers of islets for transplantation, mainly due to the continual shortage of donor pancreata.

Six alternative strategies for the improvement of current islet cell transplantation techniques are now under investigation: (1) immune tolerance induction towards transplanted islets for circumventing autoimmunity, (2) new sources of islets and methods for transplantation, (3) gene therapy, (4) beta cell regeneration, (5) stem cell therapy, and (6) the development of closed-loop systems. Further, several groups are working towards the development of novel approaches that may ultimately prevent T1D.

**1. Immune tolerance induction:** The primary intent of immune tolerance induction is to eliminate the autoimmune destruction of beta cells by modifying

the patient's own immune system, facilitating greater "tolerance" of the transplanted foreign cells. Immune cells from the donor may be used to induce hematopoietic chimerism, such as with co-infusion of mesenchymal stem cells and donor bone marrow [Itakura et al., 2007]. Another potential approach involves the isolation, expansion, and infusion of regulatory T cells [e.g., CD4+CD25+ (Ikemoto et al., 2004; Tarbell et al., 2006) or CD8+ T-cells (Liang et al., 2005)]. Modified donor T cells may be activated via insertion and upregulation of the IL-10 gene may also be infused prior to transplantation (Carter et al. 2004). Further, co-infusion of bone marrow and CD4+ T-cell-depleted splenic cells are being tested for induction of mixed chimerism without GvHD (Zhang et al., 2006). It is possible that the addition of appropriate donor lymphocytes post-transplant may also induce immune tolerance (Guo et al., 2005).

**2. New sources of islets and methods for transplantation:** Ongoing research aims to discover and generate new sources of islets for transplantation, such as the use of living-donor islets (Matsumoto et al., 2005) and animal sources of islets (Yonekawa et al., 2005). The establishment of islet cryopreservation banking systems has emerged as a potential means of circumventing the continual shortage of available islets by enabling the preservation of islets for later use. Advances in islet isolation and quality assessment will increase the efficiency of harvesting functional donor islets from limited cadaveric sources, and will facilitate the licensing of islets by the FDA as a therapeutic biological product. Enhancements in engraftment and monitoring procedures, as well as in methods for the encapsulation of islets using polyethylene glycol (Lee et al., 2006) and semi-permeable membrane microencapsulation technology, will help to protect and ensure the survival of islets in the host, as will the development of alternative transplant sites outside of the liver.

**3. Gene therapy:** Numerous groups seek to use gene therapy as another means to improve islet transplantation outcomes. First, islets can be engineered to express proteins/factors to enhance their survival *in vivo*. For example, the expression of Akt1 protein kinase may help resist pro-inflammatory cytokine-induced cell death (Contreras et al., 2006). Insertion of the heme oxidase-I gene has also been shown to improve islet survival and insulin release (Li et al., 2006). Up-regulation of VEGF (Jia et al., 2007), hepatic growth factor (Garcia-Ocana et al., 2005), and IGF-I (Liu, 2007) within islets may encourage islet revascularization and regeneration. Second, the transplant recipient may be given gene therapy to suppress the host immune response (e.g., up-regulation of IL-10 or TGF-1B) (Casu et al., 2005); this method may be useful in blocking development of T1D if administered early enough in the case of pre-diabetic patients. Third, gene therapy may be used to engineer/activate the glucose-response and insulin-release machinery in non-pancreatic cells (Jun and Yoon, 2005).

**4. Beta cell regeneration:** Furthermore, the perfection of methods for differentiating stem cells may also prove useful in stimulating *in vivo* beta cell regeneration. For example, adult beta cell mass typically fluctuates in response to physiological cues such as pregnancy and insulin resistance, and it may be possible to harness these mechanisms to stimulate the expansion (Lipsett et al., 2006) and/or regeneration of beta cells in the diabetic patient (Nir et al., 2007). Also, hormones such as glucagon-like peptide 1 (GLP-1)/exendin-4 have shown promise in stimulating beta cell regeneration (Noguchi, 2007). Nevertheless, it should be noted that regenerated beta cells may still succumb to immune destruction if the appropriate immune tolerance strategies were not invoked successfully.

**5. Stem cell therapy:** Improvements in the field of stem cell biology represent an opportunity to create an unlimited supply of cells for islet transplantation. Many groups are attempting to obtain stem cells from various sources (Meier et al., 2006), such as islet precursor cells from adult islets (Davani et al., 2007) or pancreatic discard (Todorov et al., 2006), non-pancreatic adult tissue (spleen, bone marrow, or liver) (Meivar-Levy and Ferber, 2003; Lu et al., 2007), embryonic stem cells (Ku, 2006), and umbilical cord blood (Sun et al., 2007). Greater advancements in stem cell technology, however, will require a better understanding of the genetic pathways involved in beta cell differentiation, including the clarification of the appropriate use of cell markers (e.g., Nestin, CK-8, CK-18) and transcription factors (e.g., Isl-1, Pdx-1, Pax-4, Ngn-3) (Di Gioacchino et al., 2005) to identify potential beta cell precursors and to determine their differentiation pathways.

**6. Closed-loop systems:** Recent technological advances have also brought the theory of closed-loop insulin-delivery systems closer to clinical implementation (Steil et al., 2006). Typically, a closed-loop system is composed of a subcutaneous glucose sensor linked to an insulin pump that is regulated by a mathematical algorithm. The intended function of these “artificial beta cells” is to mimic physiologic blood glucose control as closely as possible. Several potential issues remain to be addressed, however, including the length of time that the implanted glucose sensor can safely remain in place, the reliability of the sensor technology, the chosen method of insulin delivery (subcutaneous or intraperitoneal), and the development of optimal control algorithms.

**Towards the prevention of type 1 diabetes:** Several new studies will examine the efficacy of novel methods for the possible prevention of T1D and its complications: docosahexaenoic acid (DHA) may have a protective role in pregnant and nursing mothers as well as in infants and toddlers; rituximab (anti-CD20) may block B-lymphocyte-mediated antigen presentation and antibody production, and thus help avoid beta cell destruction; mycophenolate mofetil with or without daclizumab may suppress autoimmunity that leads to T1D; oral insulin may aid in the prevention or delay of T1D; anti-CD3 may prevent patients at high risk for T1D (antibody-positive subjects) from progressing to frank disease.



Additional trials still in development will be aimed at significantly modifying and ameliorating the course of new-onset T1D, focusing on the possible roles of CTLA-4Ig and the GAD vaccine in preserving C-peptide; the preservation of residual beta-cell activity with Exenatide (GLP-1 agonist) and anti-CD3; and the use of intensive metabolic control (continuous glucose monitoring and closed-loop insulin delivery in the hospital, followed by continuous monitoring and an insulin pump at home).

**Conclusion:** The collaborative efforts of islet transplantation, transplant immunology, stem cell biology, and beta cell biology laboratories worldwide has resulted in a frenetic pace of discovery for new breakthroughs in translational research and biomedical technology. Novel immune tolerance strategies and safer immunosuppression regimens are being developed to improve islet survival *in vivo* through the prevention of autoimmunity. Advancements in adult and embryonic stem cell biology may provide an opportunity to create unlimited sources of islets for transplantation. Limited evidence from animal studies has suggested that by circumventing autoimmunity, native islets, and even transplanted islets, may be able to regenerate *in vivo*.

It is strongly hoped that if the current trajectory of positive research progress continues at the present rate, the goal of developing safe, effective, and viable therapeutic interventions, and even permanent disease-prevention strategies, will materialize in the near future for type 1 diabetes.

## **SOCIETY OF RESOURCE DEVELOPMENT FOR STEM CELL RESEARCH IN EGYPT**

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Following a meeting of "Egyptian Society for Stem Cell Research", in Hurgada, Egypt, May 2007, a group of attendees, upon a recommendation of the Society, formed the "Society of Resource Development" with the vision of developing Human Resources and Infrastructure to support stem cell research.

The Strategic Goals were (1) to facilitate training and education among stem cell professionals in Egypt, (2) to provide free review and evaluation for Clinical Trial proposals and (3) to promote integration between stem cell facilities present at existing stem cell interest groups in Egypt.

### **The Objectives were:**

1-a: To discuss (through a closed on line Google group) the latest publications, world-wide,

-b: To provide information about forthcoming regional or international stem cell conferences, and Hepatitis C virus and liver failure in particular.

-c: To facilitate training opportunities for junior researchers in established centers.

2-a: To introduce internationally accepted requirements (by WHO and FDA) for Clinical Trials, with emphasis on Ethical aspects, and criteria for Inclusion or Exclusion of patients from the Trial.

-b: To help in reviewing a clinical trial, according to the international criteria, when asked.

3-a: To identify existing facilities and expertise within current stem cell institutions in Egypt and facilitate permissions or subleases for use of a particular equipment, by a researcher from a sister institution.

-b: To discuss approaches to optimize productivity of each researcher and synergy between researchers.

## BIPOLAR EPICARDIAL RADIOFREQUENCY ENERGY FOR ATRIAL ABLATION IN OFF-PUMP BEATING PORCINE HEARTS

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**Background:** Atrial fibrillation (AF) is an abnormal heart rhythm that involves the two upper chambers (atria) of the heart. AF is the most common arrhythmia that risk increases with age. In AF, the normal electrical impulses that are generated by the sinoatrial node are overwhelmed by disorganized electrical impulses that originate in the atria and pulmonary veins, leading to conduction of irregular impulses to the ventricles that generate the heartbeat. The result is an irregular heartbeat which may occur in episodes lasting from minutes to weeks, or it could occur all the time for years. The natural tendency of AF is to become a chronic condition. AF also is common complication after cardiac surgery. AF is often asymptomatic, and is not in itself generally life-threatening, but may result in palpitations, fainting, chest pain, or congestive heart failure. Patients with AF usually have a significantly increased risk of stroke (up to 7 times that of the general population). We investigated the effectiveness of a novel bipolar epicardial Coolrail™ pen and Synergy™ clamp (AtriCure Inc, Cincinnati, Ohio) in abolishing the bidirectional electrophysiologic conduction as assessed by electro-sensing and pacing in a porcine model of off-pump beating hearts.

**Methods:** Anesthetized animals (n=6) were instrumented to monitor arterial blood pressure, EKG and external pacing conduction at 130 bpm. A median sternotomy was performed and the chest was opened. The pen delivered 30 Watts for 50 seconds and the clamp delivered energy until measured tissue impedance indicated transmural. The lesions were made on the left and right atrial appendages, around the pulmonary artery and right coronary artery and sinus. Three hours after delivery of energy, hearts were infused with 1% triphenyl tetrazolium chloride (TTC) for twenty minutes. Hearts were KCl-arrested, flushed with TTC then dissected, immersed in TTC for 30 minutes and fixed in 10% buffered formalin. Gross assessments (TTC staining) while tissue sections stained with phosphotungstic acid/hematoxylin were reviewed by an experienced pathologist. Successful ablation was achieved by correlating the depth of transmural tissue necrosis and electrophysiologic conduction.

**Results:** Coolrail ablation resulted in loss of electrogram by 75-100% of the time and produced complete bidirectional conduction block for an external pacing. Histologic transmural necrosis was observed (excluding the trabaculae) in 90% of tissue equal or under 3.0 mm in thickness. The clamp was effective in producing transmural necrosis at all sites in the pulmonary veins with bidirectional block. The presence of a coronary artery or coronary sinus in the region of lesion did not result in injury or thrombosis even if the histologic lesion extended beyond the atria.

**Conclusions:** The bipolar coolrail pen and synergy clamp are effective devices in creating histologically transmural necrotic lesions and producing an acute bidirectional block in off-pump beating porcine hearts.

## **A MULTIFACETED APPROACH TO CLIMATE CHANGE: ENVIRONMENTAL, HEALTH AND ETHICAL CONSIDERATIONS**

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Climate change, with the resulting global warming, represents an overarching and challenging issue for humanity of unprecedented dimensions. Therefore, a multifaceted approach to its examination is necessary. In this paper, the author examines human activities leading to climate change emphasizing the three major dimensions of environmental health, public health and ecological ethics. Within this context a number of scientific methods are utilized including the use of epidemiological studies of past events to predict future consequences of global warming on the human populations in developed countries such as the United States and developing nations such as Egypt. Additionally, public policy issues and moral considerations will be discussed including their relationships to reaching a rational approach to dealing with climate change in a holistic manner.

***ACCREDITATION AND CREDENTIALS / EDUCATION***

## **MODERN EDUCATION IN EGYPT PRIVATIZATION OF EDUCATION IN EGYPT**

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The Egyptian education system is made up of four main stages: primary, preparatory, secondary and tertiary education. In addition, two years of kindergarten (KG 1 and 2) are offered at the pre-school level. Basic education is comprised of six years of primary and three years of preparatory school. After preparatory school, students are tracked either into general secondary school, which lasts three years and prepares them for university. Today, a large part of instruction and learning in Egypt, thus, takes place outside of the official classroom, either at home or in private tutoring centers. Looking at private tutoring in Egypt, we are dealing with an informal practice that takes place within a formal system. The privatization of education is taking place on two levels simultaneously in Egypt: On the official or formal level, a growing number of private schools and universities are being established, while at the same time a “shadow education system” of private supplementary tutoring has evolved on the informal level and out of the reach and control of state control.

The informal practice that has evolved as a strategy for coping with the deficiencies of the formal system contributes to the further deterioration of its quality, or at least prevents substantial improvements. The system is reinforced and stabilized on a low level of performance. This abstract deals with possible methods to introduce the concept of quality in Egyptian education. This may be through setting sound basis of a well established and monitored curriculum, improving income of teachers and changing attitudes of public towards privatization of education.

## EXPERIENCE OF QUALITY MANAGEMENT IN THE FACULTY OF MEDICINE CAIRO UNIVERSITY

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In February 2000, the Ministry of higher education and research decided upon the establishment of an agency for Quality Assurance and Accreditation, as part of the Government's reform programme for Higher Education in Egypt, 25 projects to enhance higher education were launched in 2003. These were coordinated by the Higher Education Enhancement Programme (HEEP). At that moment Kasr el Aini School of medicine started a **self assessment** study as a tool for evaluation and acquisition of **monitored corrective actions** seeking for **improvement** and **development**, aiming for national and international **accreditation**. The faculty through its Medical Education and Development Center (MEDC) started by:

- A) **Self study in November 2003**, by 1) Awareness campaign for initiating culture of quality and designing and organizing workshops for faculty members. 2) Taskforce nomination, 3) Approval of the benchmark (nine standards of WFME, the basic part of the standards Copenhagen, Denmark, March, 2003), 4) Data collection through interviews and documents, questionnaires and focus group discussion, 5) Analysis of collected information, 6) Identify points of weakness and strengths and plan for reformative and corrective action, 7) Writing the final report, then approval by the faculty council and spreading the results among the faculty members, students and other stakeholders, 8) Development and implementation of action plan that address the weaknesses and methods to improve. The academic and non academic staff spent more than 500 working hours on the study. The study demonstrate five critical areas of strategic importance should be addressed to improve learning and graduate competencies: 1) Curriculum revision, 2) Staff training, 3) Revision of adequacy of resources, 4) Evaluation of educational program, 5) Revision of the student admission policy. The self study report was approved by the faculty council in 2004.
- B) **Invitation of the WFME** to make an external evaluation based on the forwarded self study in 2004. The Site visit of the WFME was for three days visit from 4 - 8 December 2004, visit different parts of the faculty, and meet staff and students the Report of the WFME submitted to the faculty in April 2005:
- C) At this stage our faculty was funded by many **projects of the Higher Education Enhancement Programme (HEEP)**, (1) Establishment of the



internal Quality assurance system of the faculty of medicine Cairo university, is one of the projects of the QAAP, Quality Assurance and Accreditation project .It was two years project, started in October 2004 (2) Establishment of LRC (learning resource center).3- Capacity building of staff, FLDP.

- D) Invitation of the peer reviewers of the **Developmental engagement (QAAP)**. The **First visit** was in (October 2005) and the **Second visit** was in April 2007. The Points addressed to be rectified were: Revision of curriculum, Establishment of code of assessment, Establishment of formative assessment, Establishment of Mentorship system. The There recommendations for Curriculum revision were establishment of strong curriculum committee, perform horizontal and vertical integration, 'Horizontal links between courses taught in the same year, Vertical links between basic and clinical sciences', decreasing the theoretical load of the curriculum and allocating more time for clinical applications and student direct learning sessions, early clinical exposure and integration with the preclinical sciences in the curriculum, incorporate in the clinical curriculum the contributions of the basic biomedical sciences, students should be encouraged to spend more time in community hospitals and clinics, curriculum should be shifted towards student-centered learning instead of teacher-centered, dividing basic science courses into semesters to decrease student work overload, and planning for elective studies to encourage students to engage n depth study of areas of interest. **Follow up report** proposed that we **should be fully prepared to apply for accreditation by completion of the academic year 2007-2008**, it include some strengths and some matters for continuous improvements.

- E) Our faculty Categorized by the QAAP as **group A** (the ready faculties towards accreditation) which will be financially supported by the Ministry of Higher Education to implement the action plan as a step for accreditation.

The chief minister's council developed an Educational Development Fund to support the faculties ready for accreditation

A Quality Assurance and Accreditation Guide (QAAG) had been designed to lead educational institutions in Egypt for international accreditation through clear implementations procedures in scheduled time with a will defined budget.

The GAAG supply the faculty with plan of action guide (as a map) for implementation of the faculty action plan and justification of the budget

- F) Meanwhile, formulation of faculty's vision, strategic objectives, and **Mission were revised** to be more realistic, and effectively disseminated.

- G) **Revision of the program and courses ILOs with the NARS,**

- H) **The process of curriculum revision and documentation** started by activation of Curriculum committee at departmental level and faculty level,

- I) **Preparation of curricula** in all undergraduate Courses, in alignment with the institution mission and the established national academic standards. Three workshops for Undergraduate medical education curriculum revision and upgrading were delivered through collaboration with the MEDC to help the departments to develop the instructional units of every course. A board of eleven staff members' experts in medical curriculum design was activated to co-ordinate, guide and follow departments' curriculum preparation. Three Follow up meeting were organized by the vice dean of education and student affairs to facilitate, empower, and follow up the experts effort, and solve the problems. The task force was motivated by some incentives
- J) A process of vertical and horizontal **integration and early Clinical exposure** in the preclinical stage will be the next steps in the academic year 2008-2009.

# IMPLEMENTATION OF PROBLEM BASED LEARNING IN DISCIPLINE BASED UNDERGRADUATE CURRICULUM IN THE FACULTY OF MEDICINE CAIRO UNIVERSITY

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Traditional discipline based learning in the Faculty of Medicine Cairo University based on the traditional hierarchy of basic biomedical sciences in the first three years and the clinical sciences in the last three years. This result in loss of the integration between them, together with lacking of students interest in studying the basic science and loss of the their conceptual understanding of its value in clinical sciences, disease diagnosis and patient managements. Many medical schools in all over the world have adopted the approach of setting up hybrid curriculum where PBL is used in parts of the curriculum simultaneously with more traditional curriculum where PBL is used as a teaching/learning method while reducing the number but retaining the traditional lectures, tutorials and laboratory sessions. This is a pilot study for implementation of hybrid PBL-traditional curriculum in undergraduate curriculum in the Faculty of Medicine Cairo University, to help early clinical exposure in the preclinical stage in the Faculty of Medicine Cairo University ,to enforce the small group teaching and tutoring as method for active learning, to train staff members to be a competent tutor and facilitator, aiming to increase the clinical competency of the Faculty of medicine Cairo University graduate in line with the Faculty mission.

**The preparatory phase**, for 2-4 months, include:

- 1) Preparation of the requires resources, (e.g. computers, library,..... )to assist students in PBL,
- 2) Design a PBL curriculum by choosing some topics of the discipline-specific curriculum of biochemistry, physiology, histology, pediatric and internal medicine to be conformed in the PBL format, (preparation of the PBL module) ,
- 3) Training of the work team for the PBL in one of the Faculties of medicine adopting PBL curriculum. Training of two or three of the junior staff in each of the involved department will be trained at the MEDC of the Faculty on PBL by experienced staff to participate in the course over the academic year period in the second year. Those trained facilitators served as the pool of faculty for the development and spread of PBL experience in the other courses.

**The implementation phase**, for the whole academic year, include:

- 1) **motivation of students** in our medical school to attend the PBL sessions as an extracurricular activity, increase awareness and emphasizing on its importance in education process .
- 2) **Recruitment** of the students in the second academic year into groups of 15-20 students x 1hour/day. The PBL sessions (tutorial, seminars and clinical sessions in the hospitals) will be held in the activities' brake within the students' schedule (from 11-12 am every day) or after the official schedule . The students can go in field visits in the primary health care unites during Saturdays' off days.
- 3) **Student Assessment: Formative** assessment of student performance during the tutorials and group discussion of problem based , rests mainly on content acquisition of problem solving scenarios and check list and tutor observations with feedback to students. **Summative** assessments of those students will be the same as the other students of the second year.
- 4) **Evaluation of the project:** Questionnaires will be conducted for students and staff feedback about the project. Students achievements (questionnaire and pass/fail rate) is compared between the group that will attend the PBL sessions and those who did not.

## NILE UNIVERSITY CONTRIBUTIONS TO HIGHER EDUCATION AND RESEARCH IN EGYPT

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The debate is raging in Egypt these days about the quality and effectiveness of its current educational system. It has become clear to most, the unquestionable tie between education and the social and economic progress of the country. The importance of overhauling the education system and enhancing the quality of education at all levels of primary, secondary and tertiary education seems to be on every one's agenda. This paper concentrates on higher level education in Egypt.

Egypt admits and supplies large numbers of university graduates, estimated to be more than 250,000 annually. The supply is often not adequately prepared to meet demands of an increasingly globalized marketplace. Unemployment of graduates of many university programs is relatively high because of shortage of skills that bring the highest value to corporations and multinationals. A skillful work force that is well-educated and marketplace savvy is still sorely needed at all levels of the organization. The government policies and academic institutions have a responsibility to make the graduates employable. This is achieved by proper guidance and by making programs relevant to the needs of society and tied to new world trends in technology and business.

This paper will present Nile University contributions in fulfilling a need. Our vision is to establish a world-class research university to serve Egypt and the region. The aim is to assist in capacity building and to grow leaders for a technology-driven economy in areas of critical importance to the national economy. Our model is based on strong collaboration with world class universities and the concept of brain circulation utilizing the expertise of the Egyptian Expatriate community overseas, as well as upon close interaction with prestigious universities, multinationals and Egyptian industry and business community.

## **A COMPARATIVE STUDY OF THE POTENTIAL EXTENSION AND DEVELOPMENTAL OUTPUTS OF SOME RESEARCH AND DEVELOPMENT APPROACHES IN EGYPT AND CANADA**

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The purpose of this study is to conduct a comparative study of the potential extension and developmental outputs of some research and development approaches in Egypt and Canada. The following approaches were studied:

- 1) The Agricultural Specific Purpose Units at the Faculty of Agriculture and the Faculty of Veterinary, the University of Mansoura and Kafer EL-Shiekh Faculty of Agriculture, the University of Tanta
- 2) The University's Research and Environment Funds at the University of Mansoura in the Faculty of Agriculture and the Faculty of Veterinary.
- 3) The Regional Councils for Agricultural Research and Extension: at the North Delta Regional Council for Agricultural Research and Extension.
- 4) The OMAFRA-Funded Research, Education and Laboratory Services Program at the University of Guelph and its colleges (Ridgetown, Alfred and Kemptville Colleges).

The data of OMAFRA Funded Research Program were collected by using mailed questionnaires, while, the data of the other approaches were collected by personal interviews. Chi-Square Test ( $X^2$ ) were used as a statistical tool.

The main findings revealed that there are significant differences between the approaches studied regarding the existence, internal consistence and sustainability of the extension and developmental services. In addition, the findings indicated that there are significant differences between the approaches studied concerning their potential extension and developmental performance and outputs.

## THE RELATION BETWEEN COLOR INTERACTION AND DYNAMIC SOUNDS IN SOME PIANO COMPOSITIONS

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The idea of this research came to observe the interaction between sound strength degree in some Piano compositions and the primary colors (PC) and secondary colors (SC), and if there is a tint color for the musical composes generally.

Also, checking up the interaction inside dynamic sounds (DS) of the piano compositions, recognizing its dominated colors, besides, the statically relation between PC, SC and DS. The analysis focused on three different piano compositions by three composers in nineteenth and twentieth centuries. .The selection was based on variety which happens in DS for these compositions, where the variety interact with different expressions for DS, whether loudness or softness or in-between to reach the research objectives.

**Keywords:** Dynamic Sounds, colors Interaction