

From the Desk of Chairman**Diagnostics : Part 12 - 23**

Prenatal tests are performed to detect abnormal conditions or diagnose disease in the fetus before it is born. These tests are intended to find out traits or characteristics of fetus that may have an adverse effect or threaten the pregnancy. Moreover, some parents are at increased risk of having a baby with certain problems and may like to go in for prenatal tests to know about them before the baby is born. It can help parents make decision about health care for their infant as some of the problem are manageable before birth while others can be administered special attention right after delivery. Again having information in advance would prepare healthcare staff better, and parents for delivery of a child with health problem or for the likelihood of a stillbirth.

Prenatal testing generally determines such defects as neural tube defects, Down syndrome, chromosome abnormalities, genetic disease, and often includes amniocentesis; chorionic villus sampling; single, double, triple screen test; maternal serum screen, and so on. These tests can be non-invasive or invasive.

The Special Feature in the present issue of the **WISTA: Diagnostics** deals with prenatal diagnosis and gives briefs on the various tests, their implications, risks and benefits. It also covers some recent patents that relate to diagnostic agents for prenatal diagnosis of preterm delivery, fetal infection and fetal damage; methods of detection of genetic disorders; and gene for identifying individuals with familial dysautonomia.

The feature on 'Trials and Testing' covers six diagnostic products that are at various stages of testing and development. 'Patents for 21st Century Applications' lists sixteen recent patents granted around the world.

Other features covered are: Scan Around the Globe; In Focus; Business Trends; Awards; Experts Converge; and Knowledge Spreads.

We welcome comments and suggestions.

Dr K V Swaminathan

CONTENTS

- **From the Desk of Chairman** [P 2]
- **Patents for 21st Century Applications.** [P 3]
- **Scan Around the Globe:** SonicHealthcare (Australia); Rapid HIV Test (Canada); Inducing Remission in Arthritis (Dubai); Lung Cancer (Pakistan); Diagnostic Facility Launched (UK); Heart Imaging (USA). [P 4 - 5]
- **In Focus:** Alzheimer's Test; DynaTrace Diagnostics; Gernomic Based Diagnostic Test; PET Scanner to Improve Diagnosis; Symptom-Screening Index. [P 6 - 7]
- **Special Feature:** Prenatal Diagnosis. [P 8 - 10]
- **Business Trends:** Co-Development Agreement; Molecular Diagnostic Agreement; ZyGem and Diagnostic Collaboration. [P 11]
- **Trials and Testing:** Chikungunya Virus Test; Determining Origin of Disease; Early Diagnosis of Health Problems; IVD Market; Test for Drug Resistant TB; Uterine Cancer. [P 12 - 13]
- **Awards :** HHS Awards; Molecular Diagnostic Test Gets Recognition. [P 14]
- **Experts Converge :** Meet on Molecular Markers in Cancer; Radiology Conference. [P 14]
- **Knowledge Spreads:** Diagnosing Non-Malignant Breast Disease; Fundamentals of Diagnostic Imaging; Sero-Diagnosis of Johne's Disease. [P 15]

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This publication aims at disseminating information on pertinent developments in its specific field of coverage. The information published does not, therefore, imply endorsement of any product/process/ producer or technology by WITT.

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PATENTS FOR 21ST CENTURY APPLICATIONS (DIAGNOSTICS)

Disclosure of new inventions is an ever growing process. Great inventions which were hitherto believed impossible attainments have now become realizable propositions, thanks to the dedication of the scientists and technologists. Inventions with a potential commercial value are invariably patented. The listing below gives a glimpse of recent inventions as disclosed in patents published around the globe related to diagnostic procedures and tools, arranged in countrywise alphabetical order.

S.No	Patent / Application Number	Title (in brief)
Australia (AU)		
1.	2008202974	Assay for detection of telomerase activity.
2.	2007216745	Detection of ras mutations.
3.	2007200598	A hepatitis C antigen antibody combination assay for the early detection of HCV infection.
4.	2006272332	Method and apparatus using infrared photothermal radiometry (PTR) and modulated laser luminescence (LUM) for diagnostics of defects in teeth.
5.	2006249271	Detection of nucleic acids.
China		
6.	88107988	Nanbv diagnostics and vaccines.
7.	86102858	Recombinant surface antigens of swine mycoplasma and vaccines and diagnostics based on them.
Hong Kong		
8.	07113302.9	Composition comprising triarylmethyl radical, useful in MRI diagnostics.
9.	05110505.2	Novel pharmaceutical composition of interferon gamma or pirfenidone with molecular diagnostics for the improved treatment of interstitial lung diseases.
10.	01108829.9	Diagnostics based on tetrazolium compounds.
United States of America (USA)		
11.	7396654	Neural proteins as biomarkers for traumatic brain injury.
12.	7396532	Nucleic acid and amino acid sequences relating to streptococcus pneumoniae for diagnostics and therapeutics.
13.	7394072	Gamma camera calibration and diagnosis using pulse injection.
14.	7393696	Bovine pregnancy test.
15.	7392307	Method and system of remote diagnostic, control and information collection using a shared resource.
16.	7392199	Diagnosing inapparent diseases from common clinical tests using Bayesian analysis.

SCAN AROUND THE GLOBE

Behind the quest for developing reliable diagnostic procedures and products, there are hosts of other aspects, issues and happenings one misses out which could be important to planners, administrators and professionals. Six such select news items gathered from published literature are reported here.

Sonic Healthcare

Australian medical diagnostic company Sonic Healthcare Ltd. has announced that it has bought Clinical Laboratories of Hawaii for \$121 million.

The company's Chief Executive Colin Goldschmidt said, "The acquisition of Clinical Laboratories of Hawaii further expands Sonic's footprint in the US laboratory marketplace and offers synergies with our existing operations in terms of purchasing, esoteric testing and sharing of best practice systems and laboratory protocols."

According to the company's website, it is one of the world's largest medical diagnostics companies, providing laboratory and radiology services to medical practitioners, hospitals and community health services. It is based in Sydney with operations in Australia, New Zealand, Britain, Switzerland, Germany and the United States.

(Australia - *INO.com*, Jun 17, 2008)

Rapid HIV Test

MedMira Inc., a developer and marketer of rapid diagnostics has said that it has submitted the MedMira Rapid HIV Test for evaluation in the World Health Organization's (WHO) new Prequalification Diagnostics Programme launched on June 16, 2008.

The Programme is designed to provide guidance and advice on quality health technologies, including rapid tests for HIV, that are supplied to people around the globe through various public health agencies including the United Nations.

According to the WHO guidelines, the Programme is designed to increase access to quality diagnostics

that are both affordable and appropriate for use in resource-constrained settings such as mobile clinics in rural areas, which have little or no access to traditional healthcare tools.

The MedMira Rapid HIV Test is built on the company's patented rapid flow-through technology platform, which is the product engine behind MedMira's successful line of rapid HIV tests that have been approved in Canada, the United States, the European Union, China, Russia, and India. The test requires no specialized training or equipment to perform, and uses a whole blood, serum or plasma specimen to deliver results in just three minutes.

(Canada- *www.pharmacychoice.com*, Jun 29, 2008)

Inducing Remission in Arthritis

European researchers have announced that a combination of drugs has been found to halt the progress or induce remission in rheumatoid arthritis, a crippling autoimmune disorder that affects the joints. A combination of Methotrexate and Etanercept helped 50% of more than 500 patients achieve clinical remission, in which they no longer showed symptoms.

A total of 80% patients no longer showed signs of inflammation characteristics of the disorder in imaging tests. Fifty percent patients achieved absence of symptoms, while 55% patients were able to function normally in their daily activities.

Prof. Paul Emery, president-elect of Eural who conducted the study said it was important to start effective treatment as soon as possible to prevent damage. "If you don't get it right at the beginning, you don't get right at the end," he said. "Once in remission, there is a good chance of stopping therapy."

Meanwhile in the UAE, many patients do not receive the most effective treatment early on, according to Dr Humeira Badsha, specialist rheumatologist at Dubai Bone and Joint Centre. She told the Gulf News that in many cases in the UAE diagnosis was delayed by more than a year.

She said "We have published in leading journals showing that the average patient here has a delay in diagnosis of more than 12 months and further delay in

treatment of more than a year. Patients here feel that there is no effective treatment and hence try alternative forms of medicine before seeing a rheumatologist."

(Dubai-Gulf News, Jun 22, 2008)

Lung Cancer

The Pakistan Tribune has reported that according to a recent study by Anil Vachani of Pennsylvania University, lung cancer may now be detected early with simple blood test doing away with the need for invasive biopsies. This finding suggests that lung cancers interact with circulating blood cells and change the types of genes that are active in these cells. He added that it was found that the types of genes present in these cells could tell whether or not cancer was present.

The finding can be potentially used to develop a non-invasive diagnostic and painless test for patients suspected of having lung cancer, he noted.

The possibility of developing such a test to differentiate between cancerous and benign lesions has enormous implications for the world of medicine and those awaiting conclusive biopsy results after preliminary testing.

Lung cancer is a very diverse disease, and screening for it can be very difficult. Vachani hoped to identify a stable and consistent way of determining the presence of lung cancer by testing for the gene expression of white blood cells. Rather than screening for factors released by the tumour into the blood stream, the test Vachani used looked at gene expression in the subject's own circulating white blood cells.

(Pakistan- www.paktribune.com, May 21, 2008)

Diagnostic Facility Launched

UK based Randox Laboratories is an internationally successful clinical diagnostic solutions company with an aim to continually improve healthcare on a global scale. Randox has invested in a diagnostic manufacturing and research and development facility in Dungloe, Co. Donegal.

This exciting venture is supported by Udaras na Gaeltachta and will create 135 new jobs throughout the next three years. The new facility

will allow the expansion of engineering and manufacturing of products developed outside Northern Ireland.

These highly trained scientists will focus on new diagnostic solutions that will improve healthcare internationally by providing rapid and reliable diagnosis.

Minister Pat the Cope Gallagher stated, "This decision by Randox, a world leader in the revolutionary area of diagnostics biochips, to locate a manufacturing facility in Dungloe is tremendous news for area and the Donegal Gaeltacht."

(UK-Randox, May 12, 2008)

Heart Imaging

A US panel of medical experts has said that makers of contrast agents used to enhance echocardiogram images need to conduct larger studies to better evaluate the heart risks seen in some patients.

They have observed that it's not that a drug or test agent is without risk, but there is a need to understand the risk.

Echocardiograms help diagnose heart disease and other conditions by using ultrasound to show moving pictures of the heart. Contrast agents such as GE's Optison and Lantheus's Definity make the images clearer in some cases.

The US Food and Drug Administration imposed warnings late last year on imaging agents made by General Electric Co's GE Healthcare and Lantheus Medical Imaging after receiving 200 reports of complications, including seven deaths.

FDA's Director of Medical Imaging Products, Dwaine Rieves, told the panel that the agency wanted advice on what safety issues to consider as companies seek to use imaging agents to diagnose other conditions such as liver problems.

Representatives for GE Healthcare and Lantheus as well as Bracco Diagnostic Inc, which sells its SonoVue contrast agent in Europe, told panelists that the agents are safe and noted that many patients given the agents are already very sick.

(USA- Science News, Jun 24, 2008)

IN FOCUS

This section gives in nutshell a few news items gleaned from published research material pertaining to diagnostics and diagnostic products. The scientists, researchers and the medical professionals may find the information of interest.

Alzheimer's Test

Amorfix Life Sciences, a company that focuses on treatments and diagnostics for brain wasting diseases, has announced that its diagnostic test for the presence of aggregated Abeta in Alzheimer's disease is ready to be applied to patient samples.

The company has adapted its test to specifically detect aggregated Abeta protein (amyloid) in femtogram quantities (ten parts per trillion) from an Alzheimer's brain when it is spiked into plasma or cerebral spinal fluid (CSF).

The company obtained ethical approval to collect and use blood from Alzheimer's patients for assay validation, and has already obtained the necessary blood and CSF samples from Alzheimer's patients and normal controls to begin testing.

"Our AD diagnostic assay is now the most sensitive test available for Abeta protein based on our survey of existing tests. We have achieved the sensitivity required to test human Alzheimer's blood and CSF for aggregated Abeta, a hallmark of Alzheimer's disease", said Dr Neil Cashman, Chief Scientific Officer of Amorfix. "In addition, we believe we can further improve the assay sensitivity by incorporating technology similar to that developed for our EPvCJD(TM) Blood Screening Assay".

Alzheimer's disease is associated with an accumulation of protein aggregates, called amyloid, in the brain. Research has shown that amyloid results from aggregation of misfolded Abeta protein. The Amorfix AD diagnostic test has been developed to detect aggregated Abeta, the characteristic feature of Alzheimer's disease, in a blood sample or CSF whereas existing assays only detect Abeta. The company believes that detection of aggregated Abeta

in blood or CSF would represent a significant advancement in the search for a reliable indicator to show evidence of Alzheimer's disease.

Amorfix Life Sciences is a theranostics company developing therapeutic products and diagnostic devices targeting brain-wasting diseases, including ALS, Alzheimer's Disease, Parkinson's Disease and variant Creutzfeldt-Jakob Disease (vCJD).

(Amorfix Life Sciences, Jun 24, 2008)

Dyna Trace Diagnostics

Frankfurt Airport (Fraport) has selected dynaTrace, a provider of lifecycle application performance management services for business-critical Java and .NET applications, to monitor and clear performance issues arising in the airport's proprietary software Integration of Contract and Calculation data to Operations (ICCO). According to dynaTrace, the company records and visually maps the precise runtime execution path, the PurePath, of every discrete transaction across heterogeneous and distributed application components down to code-level.

The company says that the PurePath, in addition to pure performance metrics, also comprises contextual information such as memory usage, method arguments, exceptions, log events, IO usage, SQL calls, and synchronisation delays. This helps it with root-cause analysis. PurePath Technology also enables the company to overcome performance problems by isolating the component that is causing the problem.

Guenter Finger, Fraport's director of operations for information and communication services, said: "The analysis capability of dynaTrace Diagnostics allows us to more quickly and accurately analyse problems in production."

(www.cbronline.com, Jun 27, 2008)

Genomic-Based Diagnostic Tests

Med BioGene's lead tests under development, Lung Express Dx™ and Lymph Express DX™, have the potential to make an immediate impact on patient care by providing a more significant understanding

of each patient's cancer, thus resulting in better-informed, more appropriate treatment decisions. The commercialization of these technologies can bring closer the ultimate goal of personalized medicine.

Med BioGene Inc. (MBI), a life science company focused on the development and commercialization of genomic-based diagnostic tests for cancer and cardiovascular disease, has announced the appointment of Dr Dreismann, PhD, to the company's Board of Directors and Chairman of its Strategy Committee.

Chief Executive Officer of MBI, Erinn Broshko stated that Dr Dreismann was one of the top industry experts in the field of molecular diagnostics. He has had a proven track-record of leadership in the development, commercialization and adoption of molecular diagnostics and brings to Med BioGene valuable experience and industry contacts.

Under Dr Dreismann's leadership as Chief Executive Officer, Roche evolved into one of the world's leading molecular diagnostics companies with annual sales of over US \$1 billion and the significant expansion of their portfolio of diagnostic tests and hardware.

(www.medbiogene.com, may 29, 2008)

PET Scanner to Improve Diagnosis

According to Japanese researchers, a prototype of a new cutting-edge PET scanner shows promise for the early diagnosis of disease. The team said, the new technology could be used to provide early-stage diagnosis of other cancers, neurological disorders, and cardiovascular disease. It could also assess patients' responses to treatments and determine the efficacy of new drugs.

"This is an exciting development in the field of nuclear medicine", Yuichi Morimoto, senior researcher for the Central Research Laboratory of Hitachi Ltd. in Tokyo, said in a prepared statement.

Morimoto further stated, "Our research indicates semiconductor scanners show great potential because of their high energy resolution and flexibility in both sizing and fine arrangement of detectors.

These characteristics should lead to improved PET images and, in turn, major advances in the practice of nuclear medicine".

Morimoto and colleagues evaluated the performance of a prototype semiconductor-based PET brain scanner. In another study, Pakistani researchers have said that a nuclear imaging technique called scintigraphy was more effective than the traditional barium x-ray method in detecting gastroesophageal reflux disease (GERD) in children with respiratory problems. This study of 55 children found that scintigraphy, in which a two-dimensional image is obtained through detection of radiation emitted by a radioactive source given to the body, detected GERD in 66.6% of children.

(HealthDay New, Jun 16, 2008)

Symptom-Screening Index

Women's reports of persistent, recent-onset symptoms linked to ovarian cancer, abdominal or pelvic pain, difficulty eating or feeling full quickly and abdominal bloating, when combined with the CA125 blood test may improve the early detection of ovarian cancer by 20%. This is according to new findings by researchers at Fred Hutchinson Cancer Research Center published online in *CANCER*.

The symptom-screening index, developed by Barbara A. Goff, MD, professor and director of Gynecologic Oncology at the University of Washington School of Medicine, is not used proactively in clinical general practice, but Andersen and colleagues are conducting a pilot study to assess the value of using it as a screening tool among normal-risk women as part of their routine medical-history assessment.

"Of course, it is the increase in the detection of early-stage disease that is the most exciting", said lead author M. Robyn Andersen, Ph.D., an associate member of the Public Health Sciences Division at the Hutchinson Center. Cure rates for those diagnosed when the disease is confined to the ovary are approximately 70% to 90%. However, more than 70% of women with ovarian cancer are diagnosed with advanced-stage disease, when the survival rate is only 20% to 30%.

(Hutchinson Center Media Relations, Jun 23, 2008)

SPECIAL FEATURE

Every one hopes for a happy healthy baby but unfortunately some couples have a greater than average chance of having a baby with serious physical or mental disabilities. This article describes the special tests that are available, while a lady is pregnant to determine whether the baby has such a problem.

PRENATAL DIAGNOSIS

Introduction

About 2 to 3 % of babies born have some type of major birth defect. The risk of some problems due to abnormal separation of genetic material (chromosomes), increases with the mother's age. About 50% of the time these types of problems are due to Down syndrome, which is the third copy of chromosome 21 (Trisomy 21). The other half of the chromosomal anomalies are caused by a variety of problems. Many of these chromosomal problems result in a severely affected baby or one which does not survive even to delivery. The incidence of Down syndrome and other chromosomal problems increases with age. At 35 years of age, the risk is about 1:200. Clearly therefore, prenatal testing for diseases or conditions in a fetus or embryo before it is born, is a valuable tool to detect birth defects such as neural tube defects, Down syndrome, chromosomal abnormalities, genetic diseases and can be used even to determine the sex of the unborn baby.

Reasons for Prenatal Diagnosis

Broadly speaking, there are three reasons for undertaking prenatal diagnosis:

- To enable timely medical or surgical treatment of a condition before or after birth.
- To give the parents a chance to abort a fetus with the diagnosed condition.
- To give parents the chance to "prepare" for a baby with a health problem or disability or for the likelihood of a still birth.

Having this information in advance of the birth means that the health care staff can better prepare themselves (have suitable treatment ready), and the parents (by providing counselling) for the delivery of a child with a health problem.

Many expectant parents would like to know the sex of their baby before birth. The Baby Gender Mentor is a controversial "home" test kit for this purpose. Other methods include amniocentesis with karyotyping, and prenatal ultrasound. In some countries, health care providers are expected to withhold this information from parents, while in other countries they are expected to give this information.

Methods of Prenatal Testing

Diagnostic prenatal testing can be by non-invasive, or invasive methods. The invasive methods can themselves be divided into those that are less invasive and those that are more invasive.

- The non-invasive methods include:
 - Examination of the mother's uterus from outside the body (feeling the mother's abdomen).
 - Ultrasound detection - Commonly *dating scans* (sometimes known as *booking scans*) from 7 weeks to confirm pregnancy dates and look for twins. The specialised nuchal scan at 11-13 weeks may be used to identify higher risks of Down syndrome. Later *morphology scans* from 18 weeks may check for abnormal development.
 - Listening to the fetal heartbeat.
 - External fetal monitoring, often known as a non-stress test.
- The less invasive methods include:
 - Maternal serum screening (single screen, double screen or triple screen). This is usually done at 15-16 week by taking a small amount of blood from the vein of the mother's arm, as substances from the fetus cross over into the mother's blood stream. Reports are available in one or two weeks. The single screen looks for alpha

fetoprotein (AFP). If this were high, it would suggest an increased risk of spinal bifida (this can also be picked up on an 18-week screening ultrasound about 95% of the time). A low level of AFP suggests an increased risk of Down's syndrome. This test will pick up approximately 30% of babies with Down syndrome.

More information can be provided by a double screen which measures both AFP as well as Human Chorionic Gonadotrophin (HCG). The combination of these two tests will pick up approximately 60% of infants with Down syndrome. A triple screen measuring AFP, HCG and Estriol, a hormone produced by the placenta, improves the pick up rate to approximately 70%. A low or high result does not necessarily mean that the fetus has an abnormality. It can mean that the fetus is older or younger than thought to be, that there are two or more fetuses, or there could be other conditions relating to abnormal levels. In addition to Down Syndrome, and neural tube defects, such as spina bifida, a small number of other chromosomal problems can also be picked up by this sort of testing.

This testing cannot tell if the baby has or does not have a chromosomal problem but instead gives an estimate of risk. The couple can then decide whether to go in for more definitive testing.

- Detection of fetal blood cells in maternal blood is also used to determine the sex of the child and can be resorted to as early as six weeks. Tests, such as the Baby Gender Mentor, allegedly use this method to determine the sex of the baby.

- The more invasive methods include:

- Chronic villus sampling (CVS) which involves getting a sample of the chronic vilus by putting a needle or catheter into the womb (uterus), using local anesthesia and taking a sample of tissue which will develop into the placenta after birth and testing it. This can be done earlier than aminocentesis, usually after 10 to 12 weeks and results are obtained a couple of weeks thereafter. CVS, however, may have a slightly higher risk of miscarriage than aminocentesis.

- Aminocentesis, which is done once enough amniotic fluid surrounding the fetus has developed into a sample. Cells from the fetus will be floating in this liquid and can

be tested for the chromosomal pattern of the fetus. It is performed by inserting a thin needle into the uterus through the abdomen and withdrawing a small amount of fluid. Such tests are offered at about 15 weeks after gestation, and results are available 2-3 weeks later. Aminocentesis carries a risk of losing a pregnancy of about 1:200 or 0.5%.

- Embroscopy and fetoscopy which involves putting a probe into a woman's uterus to observe (with a video camera) or to sample blood or tissue from the baby.

Risk Factors

The following categories of women are more at risk and would qualify for prenatal testing:

- Women over the age of 35.
- Women who have previously had premature babies, or babies with birth defect, especially heart or genetic problems.
- Women with high blood pressure, lupus, diabetes, asthma, or epilepsy.
- Women who have family histories or ethnic backgrounds prone to genetic disorders, or whose partners have these.
- Women who are pregnant with multiples (twins or more).
- Women who previously have had miscarriages.

Practical Issues

It must be remembered that no prenatal test can detect all forms of birth defects and abnormalities. Ultrasound which is considered a screening test of an unborn baby, can sometimes miss subtle abnormalities. For instance, studies show that a detailed ultrasound, also called level 2 ultrasound, can detect up to about 80% of spina bifida. Ultrasound results may also show "soft signs" such as echogenic intracardiac focus of choroid plexus cyst which are usually normal but can be associated with an increased risk of chromosome abnormalities.

Similarly, other screening tests such as the AFP triple test, can have false positives and false negatives. Even when the AFP triple test results are positive, usually the pregnancy is normal but additional diagnostic tests may be offered. Furthermore, higher maternal serum AFP level indicates a greater risk of anencephaly and open spina bifida. Amniotic fluid acetylcholinesterase and AFP level are more sensitive and specific than MSAFP in predicting neural tube defects.

In some genetic conditions, for instance cystic fibrosis, an abnormality can only be detected if DNA is obtained from the baby. Usually an invasive technique is needed to do this. If genetic disease is detected, there is often no treatment that can help the fetus until it is born. It does give parents the option to consider abortion of the baby. If abortion is not an option for a particular couple, because of their own beliefs or the laws of their country, invasive prenatal diagnosis of such a condition is unhelpful, as the test puts the child at risk and knowing the result does not help the child. Genetic counselling can help families make informed decisions regarding the results of prenatal diagnosis.

Ethical Issues

Various ethical issues also arise in the case of prenatal diagnosis.

At the least controversial level, having regard to the fact that the parents need to be well informed if they have to consider abortion versus continued pregnancy, the question would arise as to how to ensure that the information about testing options is given to parents in a non-directive and supportive manner. The option to continue pregnancy or abortion being the main choice after most prenatal testing, with just occasionally fetal intervention corrective procedures being rendered possible, the question would arise whether the risks of prenatal diagnosis, such as amniocentesis, are worth the potential benefits.

More serious are the fears that this may lead to being able to pick and choose what children parents would like to have, which in turn could lead to the choice in sex, physical characteristics, and personality in children, with all the distasteful aspects of eugenic selection. Questions would also arise about the value of mentally/physically disabled people in society, instead of treating all life as sacred.

Some Recent Patents

While these issues will continue to be debated, the march of science and progress does not cease.

In June 2007, US Patent No 7,232,661 was awarded to Bo Hyun Yoon of South Korea for a method for the prenatal diagnosis of preterm delivery, fetal infection, and fetal damage and a diagnostic reagent system and diagnostic kit for the diagnosis. The invention is based on the finding that the level of MMP-8 in the amniotic fluid is significantly higher when the pregnant woman is at risk from preterm delivery, intrauterine infection and fetal damage. The diagnostic reagent system and kit can be applied to patients with or without clinical symptoms of preterm labor or premature rupture of fetal membranes. With its superiority in sensitivity and specificity as well as its less invasiveness, as compared to the conventional method of measuring fetal blood cytokine levels, this diagnostic reagent system and kit is very useful in the prenatal diagnosis of preterm delivery, fetal infections and fetal damage. The assignee is the Seoul National University Industry Foundation, South Korea.

Similarly on February 19, 2008, US Patent No 7,332,277 was awarded to Ravinder Dhallan of Bethesda, Columbia, USA, for an invention that provides for a method useful for the detection of genetic disorders, including chromosomal abnormalities and mutations. The invention provides a rapid noninvasive method for determining the sequence of DNA from a fetus. It is especially useful for detection of chromosomal abnormalities in a fetus, including translocations, transversions, monosomies, trisomies, and other aneuploidies, deletions, additions, amplifications, translocations and rearrangements. The invention further provides methods of isolation of free DNA from a sample. The assignee is RaviGen, Inc. of Columbia, USA.

Some other recent US patents on prenatal diagnosis include patent No 7,314,713 for the obesity gene and use thereof; patent No 7,388,093 for the gene for identifying individuals with familial dysautonomia; and patent No 7,374,884 for the diabetes gene.

BUSINESS TRENDS

This section presents trend-setter happenings which may have far reaching consequences in the diagnostic business world.

Co-Development Agreement

UK based Syntopix has signed an agreement with Procter & Gamble to co-develop and commercialise its anti-microbial technology for the treatment of dermatological diseases.

Stephen Jones, CEO of Syntopix, said, "I am delighted that Syntopix has entered into this joint development agreement with Procter & Gamble, the world's largest consumer goods product company. We believe that Syntopix' anti-microbial technology has the potential to improve the effectiveness of consumer healthcare brands and it is particularly pleasing to sign this agreement with a company, such as Procter & Gamble."

Syntopix focuses on improving compounds with well established properties such as anti-inflammatories and anti-microbials. Syntopix investors include the University of Leeds and the Wellcome Trust.

(bulletin. sciencebusiness.net, Jul 4, 2008)

Molecular Diagnostic Agreement

GE Healthcare, a subsidiary of the General Electric Company, has signed a non-exclusive agreement with Merck & Co., Inc to share technology on imaging of the lungs that may help to advance respiratory treatment development.

Under the terms of the agreement, Merck will be granted access to Spin Signal Technology™ (SST) utilizing hyperpolarized Xenon 129 gas, a molecular imaging agent that is under investigation by GE Healthcare to provide high speed, quantitative imaging of the lung, using Magnetic Resonance Imaging (MRI).

This agreement is part of GE Healthcare's strategy of helping to accelerate the development of new therapeutics by improving Pharma access to novel molecular imaging agents to assess the impact of

potential drugs in animal models, when appropriate, human subjects.

GE Healthcare provides transformational medical technologies and broad range of products and services that enable healthcare providers to better diagnose and treat cancer, heart disease, neurological diseases and other conditions earlier. Its vision for the future is to enable a new "early health" model of care focused on earlier diagnosis, pre-symptomatic disease detection and disease prevention.

(www.dotmed.com, Jun 26, 2008)

ZyGem and Diagnostec Collaboration

ZyGEM Corp Ltd. and DIAGNOTEC S.A. have announced that they have entered into an agreement to produce molecular diagnostics for the detection of infectious pancreatic necrosis virus (IPNV), a deadly pathogen that attacks salmon and other fish species.

The collaboration is to harness ZyGEM's advanced enzymatic nucleic acid extraction technology and DIAGNOTEC's expertise in identification and testing for diseases affecting fish and other food crops, and provide fast, accurate and affordable detection of IPNV. DIAGNOTEC will use ZyGEM's enzymatic DNA detection tools in its IPNV products and services for the Chilean salmon industry, which is among the largest producers of salmon in the world.

CEO of ZyGEM, Paul Kinnon said, "As demands on the global food industry rise, innovative approaches for maintaining the health and productivity of food stock species are growing in importance. DIAGNOTEC is an emerging leader in the development of innovative diagnostics to detect and prevent spread of food species pathogens, and we welcome the opportunity to incorporate our unique enzyme-based nucleic acid extraction technology to further enhance their diagnostic products and services for the aquaculture sector."

ZyGEM Corporation Limited is a rapidly growing biotechnology company with a range of innovative enzyme-based products and technologies based on the company's exclusive collection of microorganisms from extreme environments.

(PR Newswire, Jun 17, 2008)

TRIALS AND TESTING

Chikungunya Virus Test

Focus Diagnostics, Inc., the infectious disease diagnostics company, a wholly owned subsidiary of Quest Diagnostics, has announced the first laboratory developed test in the US for detecting the mosquito-borne chikungunya virus.

The US Centers for Disease Control and Prevention (CDC) has suggested that the chikungunya virus, which caused an outbreak in Italy in 2007, has the potential to enter and spread in the US.

Dr Jay M. Lieberman, Medical Director, Infectious Diseases, Focus Diagnostics, said, "The availability of our chikungunya virus polymerase chain reaction (PCR) test will give healthcare providers in the US an important option for identifying patients, particularly travelers, who may be infected with this potentially disabling virus. In recent years, Focus Diagnostics has brought to market new diagnostic test that physicians can use to diagnose emerging infectious disease, such as West Nile virus and SARS. If chikungunya emerges in the US, our test could become an important tool to help mobilize an effective public health response.

Chikungunya is a challenge to diagnose because its symptoms can mimic those of other diseases, including other mosquito-borne diseases, so the availability of an accurate diagnostic test is essential to minimize spread of the disease."

Focus Diagnostics is providing reference laboratory services to hospitals and laboratories nationwide, and manufacturing and distributing diagnostic products worldwide.

(Quest Diagnostics Inc, Jun 1, 2008)

Determining Origin of Disease

That diagnostic tests could pinpoint the origins of cancers, pathologists at the Stanford University

School of Medicine in USA are trying out a new test from a Sunnyvale company that could give cancer patients a better chance of getting most effective treatment.

Pathwork Diagnostics Inc, has developed the test which is part of a growing drive to use genetic analysis and molecular markers to guide the choice of therapies in many disease types. Pathwork's test has been designed to ferret out a key fact that helps determine which treatment would work best for each patient with advanced cancer.

(The Daily Scan, May 3, 2008)

Early Diagnosis of Health Problems

According to research released by Medco Health Solutions, a New Jersey based pharmacy benefits manager, during 2007, 51% of Americans with health insurance took prescription drugs to treat at least one chronic health problem.

Robert Epstein, Medco's chief medical officer, said, "We have now reached the tipping point where treating chronic diseases and conditions is more common than not".

He further observed, "It does show that people are receiving treatments which can prevent more serious health problems down the road."

Medco's research, which is culled from the prescription claims of 2.5 million insured Americans shows that taking chronic medicines starts early. Nearly 30% of children under the age of 19 are taking a medicine regularly for asthma, allergies or attention deficit disorder.

(The Star-Ledger, May 15, 2008)

IVD Market

The world market for in-vitro diagnostics (IVD), estimated at \$ 42 billion in 2007, is expected to grow 6 percent annually through 2012, according to a report by market research firm Kalorama Information.

According to the report, after tremendous consolidation in the IVD industry, just 16 top-tier companies presently own 86% of the market. Comparatively, 18 top-tier companies held 72% of the market in 2005.

The report says that the IVD market has also changed dramatically due to advances in functional genomics, bioinformatics, microelectronics, test device miniaturization and new features, such as wireless capability. Furthermore, the publication of the human genome project makes it possible to link specific genes to disease risks, creating a significant opportunity for IVD makers.

Kalorama reported that IVD product development is being influenced by several factors, including the increasing need for accurate data and rapid test results, rising healthcare costs and managed care's obsession with cost reductions, which is pushing the need for decentralized near patient testing. An emphasis on outcomes-based disease management dictates that new tests must prove their added value to patient care, affecting how many and which tests are recommended and thus, reimbursed.

(Health Imaging News, Jun 3, 2008)

Test for Drug Resistant TB

A two-pronged initiative aims to speed up diagnosis and treatment of people with multidrug-resistant tuberculosis (MDR-TB) in developing countries.

The aim is to increase that proportion over the next four years to at least 15%.

MDR-TB responds poorly to standard treatment because of resistance to the first-line drugs isoniazid and rifampicin. It is estimated that only 2% of MDR-TB cases worldwide are being diagnosed and treated appropriately, owing mainly to inadequate laboratory services.

In developing countries most of the TB patients are tested for MDR-TB only after they fail to respond to a standard treatment. It takes two months or more to confirm diagnosis.

The World Health Organization (WHO) is working with partners to make a rapid test-which could give results in two days, more widely available. It is working on these initiatives with the Stop TB Partnership, Unitaid, an international drug purchase facility and the Foundation for Innovative New Diagnostics (FIND).

(news.bbc.co.uk, Jun 30, 2008)

Uterine Cancer

BiPar Sciences, Inc, has announced that it has expanded its clinical trials programme through the initiation of an additional Phase 2 study of its lead product candidate BSI-201. The trial will assess BSI-201, the first ADP-ribose polymerase (PARP) inhibitor in the company's DNA repair portfolio, for the treatment of uterine carcinosarcoma or malignant mixed mullerian tumors.

The primary objective of this trial is to determine the antitumor activity of BSI-201 plus carboplatin/paclitaxel in patients with recurrent or advanced uterine carcinosarcomas.

"Current treatments for uterine carcinosarcoma remain limited and are often poorly tolerated," said Carol Aghajanian, M.D., chief of the gynecologic medical oncology. "We hope this drug will play a transformative role in the way we approach treatments."

BiPar Executive Vice President Barry Sherman, M.D., observed, "Because PARP is expressed at high levels in uterine cancer and particularly MMT, we believe that BSI-201 has the potential to selectively target these highly aggressive and poorly treated tumors. This will be our third study designed around our gene expression data, which has been invaluable in selecting types of cancer that will most likely respond to PARP inhibition."

Uterine cancer is the most common gynecological tumor, and the fourth most common type of tumor in women. 40,000 new diagnoses are made each year in the United States.

(BiPar Sciences, Jun 5, 2008)

AWARDS

HHS Awards

US Department of Health & Human Services (HHS) Secretary Mike Leavitt announced that the Centers for Disease Control and Prevention (CDC) has awarded \$ 12.9 million for the development of low-cost influenza tests that can detect and differentiate seasonal human influenza viruses from avian influenza within three hours.

Secretary Leavitt said, "The early detection of emerging pandemic influenza is critical to the nation's pandemic response. Early detection will aid in improving patient survival, overall health outcomes, and use of containment measures in the event of an influenza pandemic." The recipients of the contract awards are: Nanogen, Inc, San Diego, Calif. and Meso Scale Diagnostics, LLC, Gaithersburg, Md., each for \$6.5 million for initial phased development. The contracts provide for funding up to \$ 10.4 million (Nanogen, Inc) and \$ 12.1 million (Meso Scale Diagnostics, LLC) for additional development up to three years.

(US Dept of Health & Human Services, Jul 12, 2008)

Molecular Diagnostic Test Gets Recognition

In 2007, Time Magazine had proclaimed MammaPrint® to be one of the best discoveries in healthcare. Now one year after the Amsterdam based company Agendia's molecular diagnostic test for breast cancer was approved by the US Food and Drug Administration (FDA), its value has been recognised in the Netherlands.

The Netherlands Health Minister recently presented MammaPrint® with an award for being one of the four most pioneering healthcare innovations, according to the Innovation Platform.

This revolutionary diagnostic test is based on DNA microarray technology and has been developed by Agendia to assess the risk of metastasis during the early stages of breast cancer, which it can do with great accuracy.

The company sells MammaPrint® worldwide, but sales in the Netherlands are still to pick up. It is expected that this will happen once it is included in the healthcare insurance package of reimbursable treatments.

(Innovation Platform, Jul 7, 2008)

EXPERTS CONVERGE

Meet on Molecular Markers in Cancer

ASCO (American Society of Clinical Oncology) NCI- EORTC Annual Meeting on Molecular Markers in Cancer will be held from Oct 30-Nov 1 2008, in the Westin Diplomat Resort & Spa, Hollywood, Florida. This event is supported by Genentech.

This second annual meeting on Molecular Markers in Cancer, hosted by ASCO, NCI, and EORTC, will bring together clinicians, pathologists, researchers, and others to accelerate progress in the rapidly advancing field of cancer markers. Evidence-based cancer diagnosis and treatment depends increasingly on the development of new molecular markers for the assessment of prognosis, treatment selection, and agent development. This activity has been approved for AMA PRA Category 1 Credit TM.

Prior to the meeting, a one and half day tutorial will address critical issues regarding new tools that aid decision making and feature didactic presentations focused on issues raised in diagnostic challenges. Participants will work in teams to put together development plans for assays that will aid clinical decisions related to choice of therapy.

(American Society of Chemical Oncology, Jul 19, 2008)

Radiology Conference

The Radiology Conference on 'Diagnostic Imaging in Alaska' will be held from Aug 15-22, 2008, in Seattle, Washington State, USA.

The Diagnostic Imaging in Alaska is a postgraduate course designed to update the diagnostic radiologists in new trends, relevant techniques, and advanced applications in diagnostic imaging. The latest advances will be emphasized and related to common problems encountered in clinical practice.

(www.mdlinx.com, Jul 10, 2008)

KNOWLEDGE SPREADS

Diagnosing Non-Malignant Breast Disease

A recent article on diagnosing non-malignant breast disease through EIT (electrical impedance tomography) describes how it enables the determination and visualization non invasively of the spatial distribution of the electrical properties of the tissues inside the body, thus providing valuable diagnostics information. The electrical impedance mammography (EIM) is a specialized EIT system for diagnostics and imaging of the breast. While breast cancer is the main target for any investigation conducted in this area, the diagnosis of non-cancerous diseases is also very important because it opens the way to improve the quality of life for many women and it may also reduce the incidence of breast cancer through effective treatment of mastopathy.

The article presents the main results of a comprehensive examination of 166 women using four methods: multifrequency electrical impedance mammography, ultrasonic investigations, x-ray mammography and puncture biopsy. The objective of the investigation is to estimate the usefulness of multifrequency electrical impedance mammography for diagnosing disharmonious mammary gland diseases.

(Physiological Measurement, Jul 14, 2008)

Fundamentals of Diagnostic Imaging

The book titled 'Fundamentals of Diagnostic Imaging' has recently been published for health and social care students and lecturers in UK. It has been edited by Dr Anne-Marie Dixo, and includes case studies, activities and clinical insights to aid understanding of diagnostic imaging.

Diagnostic imaging is widely used in health care to arrive at a diagnosis of illness and to guide therapeutic techniques to alleviate, and in some cases cure illness. The number of medical imaging investigations performed is increasing and most patients and health care professional will encounter the Diagnostic or Medical Imaging department of the hospital as a matter of course.

Professional barriers are being broken down in the modern NHS, and as new ways of working are used to deliver high quality patient-focused care, doctors are often involved in requesting medical imaging tests.

This book provides an introductory overview of a wide range of commonly encountered medical imaging tests, including radiation based techniques such as plain film radiography, computed tomography and nuclear medicine, and non-ionising imaging techniques such as medical ultrasound and magnetic resonance imaging. Each chapter has an initial section explaining 'how the technique works' and a second section describing 'what the technique is used for'. Learning is supported with case studies, activities, explanations of technical procedures and terminology, diagrams and photographs.

(Reflect Press, Jul 11, 2008)

Sero-Diagnosis of Johne's Disease

The findings of a recent project titled 'Rapid Label Free Sero-diagnosis of Johne's Disease using Surface Plasmon Resonance Biosensor' by Jagadeesan et.al have been published in June 2008 by the Agricultural Research Service of USA..

Johne's disease (JD) is a chronic and progressive intestinal disease occurring mainly in dairy cows caused by Mycobacterium paratuberculosis (Map). Individual fecal culture is the most definitive method of diagnosis since it can detect Map during both sub-clinical and clinical stages of JD with an estimated specificity of 100% and sensitivity of 40-80%. The test, however, requires up to 16 weeks of incubation. Hence, the most common diagnostic test for Map is serum ELISA.

The sensitivity of ELISA test, however, is low (15%) in subclinically infected cows, thus, any significant progress in the control of JD depends upon the development of a diagnostic test with high sensitivity and relatively short turnaround time. Thus, in this study, we tested the use of surface plasmon resonance (SPR) biosensor for the sero-diagnosis of Johne's disease. SPR sensor can sensitively measure the binding events between two molecules, occurring on the gold surface.

(Agricultural Research Service, Jul 14, 2008)