Patent Annotations:

The patents annotated in this section have been selected by the authors of this issue as the most important patents of relevance to their field.

ADVANCED NANOTECHNOLOGICAL APPROACHES FOR DESIGNING PROTEIN-BASED "LAB-ON-CHIPS" SENSORS ON POROUS SILICON WAFER

1. **Methods for fabricating microarrays of biological samples,** ***Brown, P.O., Shalon, T.D.: US5807522 (1998).***

Commentary:

The present annotation describes the method and apparatus for fabrication of micro arrays from biological samples

2. **Ink-jet method of spotting a probe and manufacturing a probe array,** ***Okamoto, T., Yamamoto, N., Suzuki, T.: US20026476215 (2002).***

Commentary:

An ink-jet method is used for spotting a probe densely and efficiently on solid surface and making a probe array.

3. **Electrochemical patterning on multi-channel microelectrode array for biosensing applications,** ***Voeroes, J., Textor, M., Tang, C., Keller, B.: WO06032158 (2006).***

Commentary:

Described technique is used to make microchip array, which can be used to study the large diversity of biological interactions for example, protein-protein interaction, protein cell interactions and protein nucleic acid interactions, etc.

4. **Protein and peptide nanoarrays,** ***Mirkin, C.A., Della, C.G., Demers, L., Lee, K.B., Park, S.J.: WO03038033 (2003).***

Commentary:

Ultra high resolution techniques of protein and peptide nano arrays are discussed in this annotation. This technique is used to study a wide range of protein and peptide structures.

5. **Biological laser printing via indirect photon-biomaterial interactions,** ***Barron, J., Ringeisen, B.R., Kim, H., Wu, P.: US2005018036 (2005).***

Commentary:

This annotation discloses the method of biological laser through indirect photon- biological material interactions.

6. **Biomaterial,** ***Canham, L.T: WO9706101 (1997).***

Commentary:

Biomaterial such as bioactive silicon may be used in the fabrication of biosensors for *in vitro or in vivo* applications

7. **Porous nanostructures and methods involving the same,** ***Sailor, M.J.: US2006105043 (2006).***

Commentary:

This annotation describes a method for the detection and sepration of a target analyte such as protein that provides a porous silicon matrix on the silicon substrate.

8. **Process of immobilizing biomolecules in porous supports by using an electronic** ***Beam, S. D'Auria, S.M. Borini, A.M. Rossi, M. Rossi: WO06059356 (2006).***

RECENT PATENTS OF GENE SEQUENCES RELATIVE TO THE PHOSPHATIDYLINOSITOL 3-KINASE / AKT PATHWAY AND THEIR RELEVANCE TO DRUG DISCOVERY

1 **PI-3 Kinase inhibitor prodrugs,** ***Garlich, J.R., Durden, D.L., Patterson, M., Su, J., Suhr, R.G.: US20056949537B2. (2005).***

Commentary:

The invention refers to a compound LY294002 and its analogs comprising of a reversibly quaternized amine being are useful as prodrugs of inhibitors of PI-3 kinase.

2. **Cloning, expression and characterisation of a novel form of phosphatidylinositol-3-kinase,** ***Stoyanov, B., Hanck, T., Wetzker, R.: EP0786004 (1997).***

Commentary:

The present invention introduces a new phosphatidylinositol-3-kinase (PI3K gamma). The diagnostic and therapeutic use of the protein, the nucleic acid and the antibody is discussed here.

3. **Phosphatidylinositol 3-kinase p110 delta catalytic subunit,** ***Chantry, D.H., Hoekstra, M.F., Holtzman, D.A.: EP1522584A3. (1997).***

Commentary:

The invention discusses a new catalytic subunit of a lipid kinase designated p110 delta and provides polynucleotides encoding p110 delta and recombinant p110 delta polypeptides.

4. **Inhibitors of human phosphatidylinositol 3-kinase delta,** ***Sadhu C, Dick K, Treiberg J, Sowell C, Kesicki E, Olivier A: US6667300B2. (2003).***

Commentary:

This invention describes the methods of inhibition of phosphatidylinositol 3-kinase delta by using PI3Kdelta inhibitory compounds. Therapeutically, this method can be used to inhibit cancer cell growth or proliferation.

5. **Condensed heteroaryl derivatives,** ***Hayakawa, M., Kaizawa, H., Moritomo, H., Kawaguchi, K., Koizumi, T., Yamano, M., Matsuda, K., Okada, M., Ohta, M.: EP1277738. (2003).***

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Commentary:

This invention concerns pharmaceutical composition, which is useful as a phosphatidylinositol 3 kinase (PI3K) inhibitor and antitumor agent. These derivatives are useful to inhibit cancer cell growth.

6. **Mutations of the PIK3CA gene in human cancers, *Samuels, Y., Velculescu, V.E., Kinzler, K.W., Vogelstein, B.: WO05091849 (2005).***

Commentary:

The present invention describes the mutation of PIK3CA gene, mostly in colon cancer and other organs of human body. It is important as a diagnostic and therapeutic aspect.

7. **Methods for modulating T cell responses by manipulating intracellular signal transduction, *June, C.H.: EP0758232B1. (2004).***

Commentary:

This invention discloses the methods for modulating T cell responses by manipulating intracellular signals associated with T cell. Therapeutically, it can act as an inhibitor or activator of phosphatidylinositol 3-kinase, which can be used to inhibit or stimulate T cell responses.

PATENTING HUMAN GENES AND STEM CELLS

1. **Marker for undifferentiated state of cell and composition and method for separation and preparation of stem cells, *Nakatsuji, N., Tada, T., Tada, M.: WO04072226 (2004).***

Commentary:

The present invention discusses a marker Stm1 gene, which is expressed specifically in a cell under an undifferentiated state if the cell has pluripotency.

2. **Agent for keeping differentiation/pluripotency, *Yamanaka, N.: JP2005110565 (2005).***

Commentary:

The invention discusses the agent that maintains differentiation/pluripotency reversibly to adjust the cell differenttiation/pluripotency. This agent is clinically applied in gene transfer method.

3. **Methods and compositions relating to restricted expression lentiviral vectors and their applications, *Trono, D., Wiznerowicz, M.: NZ532060 (2005).***

Commentary:

HIV-derived lentivectors are safe, highly efficient and very potent for expressing transgenes for human gene therapy. The lentiviral vector comprises of promoters active to promote expression specific to cell types or tissues. These vectors are helpful tools for genetic treatments.

4. **Methods and compositions for cell therapy, *Cibelli, J., Dominko, T.: US2006083722 (2006).***

Commentary:

By using this histocompatible method, cells and tissues can be transplanted to human or non-human mammals. The present invention is useful for developing and testing methods for cell and tissue therapy, genetic imprinting, reprogramming, rejuvenation and others.

5. **Bank of stem cells for producing cells for transplantation having HLA antigens matching those of transplant recipients, and methods for making and using such a stem cell bank, *West, M.: US2004091936 (2004).***

Commentary:

The invention describes the methods for producing stem cell banks, preferably human, which optionally may be transgenic. These methods are helpful in differentiation of cells for therapy, especially acute therapies, for screening drugs and for disease treatment

RECENT PATENTS RELATING TO TUMOR SUPPRESSOR GENES

1. **WWOX: a tumor suppressor gene mutated in multiple cancers, *Aldaz, C.M., Bednarek, A.: US20067060811 (2006).***

Commentary:

The present invention relates to a tumor suppressor gene. This invention provides a method for the detection and diagnosis of cancer by involving **WWOX** nucleic acids and polypeptides

2. **Tumor suppressor protein involved in death signaling and diagnostics, therapeutics, and screening based on this protein, *Kidd, V.J., Lahti, J.M., Teitz, T.: US20067052834 (2006).***

Commentary:

This invention illustrates the identification of tumor suppressor protein activity, which relates to diagnostic, therapeutic compositions and methods.

3. **Tumor suppressor CAR-1, *Killary, A., Lott, S., Chandler, D.: U2005S6943245 (2005).***

Commentary:

Tumor suppressor CAR-1 is gene have a direct implication in colon, kidney and breast cancer. It is useful in the diagnosis of CAR-1-related malignancies.

4. **Human Cervical cancer suppressor protein, polynucleotide encoding the protein, cell transformed with the polynucleotide and method for suppressing proliferation of cancer cell using the expression vector, *Kim, J.-W.: US20056977296 (2005).***

Commentary:

Human tumor suppressor protein has an amino acid sequence of SEQ ID NO: 2; a poly-nucleotide encoding the tumor suppressor protein which is an expression vector. It is useful in pharmaceutical composition for cancer treatment.

5. **Tumor antigen based on products of the tumor suppressor gene WT1, *Sugiyama, H., Oka, Y.: US20067030212 (2006).***

Commentary:

The invention discusses a tumor suppressor gene WT1 binding to major histocompatibility complex (MHC) class I, and a vaccine comprising antigen.

6. **Gene encoding promoter domain of tumor suppressor gene p51 and use thereof, *Sakai, T., Kagaya, S., Sato, T., Sukenaga, Y., Fujii, H., Toshiyuki, S.: US20067038028 (2006).***

Commentary:

A gene encoding the promoter region of a protein p51, which is capable of inducing cell death. It is useful in diagnosing and treating diseases including cancer, etc.

MODULATING MITOCHONDRIA-MEDIATED APOPTOTIC CELL DEATH THROUGH TARGETING OF BCL-2 FAMILY PROTEINS

1. **Inhibitory oliogonucleotides targeted to Bcl-2, *Chen, Z., Ruffner, D. E., Prakash, R., Koehn, R.: WO04046327 (2004).***

Commentary:

The invention discusses inhibitory oiliogonucleotides having three specific target regions, which inhibit the expression of Bcl-2 in a cell or tissue.

2. **RNA interference mediated inhibition of Bcl2 gene expression using short interfering nucleic acid (siNA), *Mcswiggen, J., Beigelman, L.: WO03070969A3 (2003).***

Commentary:

The importance of short interfering nucleic acid **(SiNA)** is discussed, which is useful in a variety of applications like therapeutic, diagnostic, target validation and genomic discoveries.

3. **Functional and hyperfunctional SiRNA, *Anastasia, K., Angela, R., Devin, L., William, M., Stephen, S.: WO04045543 (2004).***

Commentary:

The present invention discloses the methods for gene silencing with the help of functional SiRNA.

4. **Stabilized alpha helical peptides and uses thereof, *Walensky, LD., Korsmeyer, S.J., Verdine, G.: WO05044839 (2005).***

Commentary:

Polypeptides are described in this invention, which are used for the treatment of diseases characterized by excessive or inadequate cellular death.

5. **Novel peptides which interact with anti-apoptotic members of the family of Bcl-2 proteins and use thereof, *Geneste, O., Hickman, J., Rain, J.C. : WO06082304 (2006).***

Commentary

The invention describes a method of screening and identifying modulators of protein interaction between novel peptides and the anti-apoptotic members of the family of Bcl-2 proteins. The modulators are administered to cancer patients in order to induce apoptotic-type programmed cell death.

6. **Novel humanin-like polypeptides and polynucleotides and their methods of use, *Ramesh, K., Xiaozhong, Q.: WO06019365 (2006).***

Commentary:

The role of humanin-like polypeptides, polynucleotides and antibodies is highlighted in the invention for the treatment and prevention of disease caused by neuronal cell death.

THE IMPORTANCE OF BIO-COMPUTATIONAL TOOLS FOR PREDICTING HIV DRUG RESISTANCE

1. **Protease inhibitors that overcome drug resistance, *Tang, J.J.N., Ghosh, A.K.: US20056969731 (2005).***

Commentary:

The present invention discusses the HIV protease inhibitors, which are the most powerful drugs in suppressing HIV in patients. This new concept is generally appropriate for the design of other resistance safe HIVPr inhibitor drugs.

2. **Methods of monitoring HIV drug resistance, *Dong, J.-Y.: US6884576 (2004).***

Commentary:

The novel method for detecting the presence of HIV virus in a sample is discussed in this invention. This method can be used to identify the presence of HIV virus, different strains of HIV virus, HIV drug resistance and can also help to identify one or more anti-HIV agents efficient in clinical aspects

3. **Method and system for predicting resistance of a disease therapeutic agent using a neural network, *Larder, B., Wang, D.: US20067058616 (2006).***

Commentary:

This invention discloses a method and system for predicting the resistance of a disease to a therapeutic agent. It also provides methods and systems for foreseeing the probability of a patient developing a genetic disease.

4. **Compositions and methods for determining epistatic relationships mutations that affect replication capacity, *Bonhoeffer, S.: US20050214752A1 (2005).***

Commentary

This invention discusses the methods for replication capacity of a virus based on its genotype. The methods are helpful in predicting viral interactions and novel targets for antiviral therapy.

5. **Rapid computational identification of targets, *Elcock, A.H.: US2006136139 (2006).***

Commentary:

This invention discusses the compositions and methods for rapid computational identification of targets.

6. **Use of computationally derived protein structures of genetic polymorphisms in pharmacogenomics and clinical applications,** ***Ramnarayan, K., Maggio, E.T.: US2006141480 (2006).***

Commentary:

Computer-based methods for predicting drug resistance or sensitivity via computational phenotyping are discussed here. Computer-based technique is used in structure-based drug design studies for identifying drugs, which are helpful in clinical applications.

7. **Artificial intelligence system for genetic analysis,** ***Osborne, G.F., Chin, S.S.M., McDonald, P., Schneider, S.: US2006212414 (2006).***

Commentary:

The present invention discloses a complete artificial intelligence system. This system reads data from a nucleic acid microarray analyzes test results and evaluates patient risk for various ailments. It is a real decision making tool that can be used in clinical analysis system.

8. **Integrated biosensor and simulation system for diagnosis and therapy,** ***Fernandez, D.S.: US20060178841A1 (2006).***

Commentary:

The invention monitors biologically an individual by using biosensors to detect cellular components. The data are simulated or analyzed using systems-biology software, which helps in diagnostic or therapeutic guidance.

CURRENT AND FUTURE DEVELOPMENTS IN PATENTS FOR QUANTITATIVE TRAIT LOCI IN DAIRY CATTLE

1. **Method of testing a mammal for its predisposition for fat content of milk and/or its predisposition for meat marbling,** ***Fries, H.-R., Winter, A.: WO03004630 (2003).***

Commentary:

This invention discusses the method for determining the genetic predisposition of a mammal for its milk fat content and/or for its intramuscular fat content.

2. **Marker assisted selection of bovine for improved milk production using diacylglycerol acyltransferase gene DGAT1,** ***Georges, M.A.J., Coppieters, W.H.R., Grisart, B.M-J.J., Snell, R.G., Reid, S.J., Ford, C.A., Spelman, R.J.: WO0236824A1 (2001)***.

Commentary:

The present invention discusses a method of genotyping bovine for improved milk production traits by DGAT1 gene.

3. **DNA markers for increased milk production in cattle,** ***Schnabel, R.D., Sonstegard, T.S., Van Tassell, C.P., Ashwell, M.S., Taylor, J.F.: WO2006076563 (2006).***

Commentary:

The invention discloses the genetic marker-assisted selection methods. It allows phenotypic testing and inaccuracies associated with traditional breeding schemes and improvement of dairy cattle herds.

4. **Allelic variants of bovine somatotropin gene:genetic marker for superior milk production in bovine,** ***Collier, R.J., Hauser, S.D., Krivi, G.G., Lucy, M.C.: US5374523 (1994).***

Commentary:

The invention discusses the bovine somatotropin gene indicative of an inheritable trait of increased milk production. The marker can be selected for inclusion in breeding programs or for milking. The desired marker indicative of superior milk production is dependent upon the breed of cattle.

5. **Marker assisted selection of bovine for improved milk composition,** ***Blott, S., Kim, J.J., Schmidt-Kuntzel, A., Cornet, A., Berzi, P., Cambisano, N., Grisart B., Karim, L., Simon, P., Georges, M., Farnir, F., Coppieters W. Moisio, S., Vilkki J., Johnson, D., Spelman R., Ford, C., Snell R.: WO03104492 (2003).***

Commentary:

The present invention describes a method of genotyping bovine for improved milk production traits by determining the GHR genotypic state. GHR gene and polymorphisms gene have been found to be associated with such improved milk production traits.