

Seminar Announcement

- All Are Welcome -

Speaker: **Dr Irit Bar-Am, PhD**
Senior Scientific Manager
Applied Spectral Imaging

Title: **Principles and applications of Spectral Imaging and Spectral karyotyping (SKY) in genetic diagnosis and research**

Date : **29 March 2012 (Thursday)**

Time : **10am – 12pm**

Venue: **Creation Theatre, Matrix Level 4, Biopolis**

Host : **Dr Giulia Rancati**
(Tel: 64070805, email: giulia.rancati@imb.a-star.edu.sg)

Abstract of the Seminar:

SKY is a novel molecular cytogenetic FISH-based technique that allows automatic color karyotyping of human and mouse chromosomes. Whereas FISH limits analysis to specific chromosomes or regions of chromosomes, SKY permits the visualization of all chromosomes at one time, 'painting' each pair of chromosomes a different fluorescent color. SKY is particularly powerful because it allows the unambiguous identification of many chromosomal abnormalities simultaneously in one metaphase after a single hybridization and imaging steps.

SKY is based on the simultaneous hybridization of 24 chromosome-specific composite probes. Image acquisition is based on a novel spectral imaging system using an interferometer and a CCD camera. Using Fourier transformation, the emission spectrum is retrieved and processed by a computer. This process allows the spectral signature to be measured at all image points (pixels). The measurement forms the basis for pixel classification by assigning all pixels with identical spectra a unique color. The technique results in a specific color being assigned to each chromosome in the image.

The applications of SKY for identifying chromosomal aberrations that are involved in human diseases are manifold. Chromosomal analysis also plays an important role in the diagnosis, treatment and prognosis of human malignancies since many cancers are associated with particular chromosomal abnormalities. However, the chromosomal origins of markers, subtle translocations, or complex chromosomal rearrangements are often difficult to identify with certainty using the standard GTC-banding techniques especially in cancer samples. SKY on the other hand, with its unique ability to visualize each chromosome in a different color, overcomes the limitations of the standard banding technique and allows a much more sensitive and accurate identification of subtle chromosomal aberrations.

SKY has also been developed for mouse models of human cancers enabling investigators to extrapolate information from mouse models of cancer to their human counterparts. SKY is also valuable in interspecies study (such as between human and primates) by comparative cytogenetics of evolutionary divergence.

In addition, the Spectral Imaging system by its unique ability to detect small changes in the spectrum in combination with morphology information, enables the characterization and quantification of different objects that have spectral differences. The system was used for many applications in cell biology research such as stem cell identification, drug delivery experiments, cancer cells classification and more.

All these applications as well as advances, limitations, clinical examples and future directions of Spectral Karyotyping (SKY) and Spectral Imaging will be further discussed.

About the Speaker:

Dr. Irit Bar-Am finished her PhD in the Department of Human Genetics in the Faculty of Medicine at Tel-Aviv University in 1994. Her main research topic was "The Organization of Chromosomes in the Interphase Nuclei"

She also handled and conducted other research activities in the field of molecular and clinical cytogenetics.

She then joined a research team at Weitzman institute in the department of molecular genetics where she did her Post Doc. on the "Expression of the AML1 gene in the mouse Thymus". Immediately following her Post Doc, she joined Applied Spectral Imaging and was one of the developers of Spectral Karyotyping (SKY).

In the company she is responsible for the development and production of the molecular probe kits. She also plays a key role in developing new applications in Cytogenetics as well as conducting clinical utility studies mainly in the field of pediatric oncology cytogenetic analysis. With over thirty publications, she is considered one of Israel's experts in FISH (fluorescent in situ hybridization) and SKY, two techniques which have revolutionized both research and clinical analysis in Cytogenetics.

For registration, please click below link, complete the registration form and email to Judy Sim @

judysim@its-sciencemedical.com

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