

Stem Cell Proliferates

Report of SAPA-West Stem Cell Symposium

Naibo Yang, PhD
Chairman of SAPA-West Science and Technology Committee

On Oct. 8th 2005, SAPA-West successfully held its first scientific symposium for this year. The topic of the symposium was focused on "Stem Cell Research", one of the hottest topics among California's scientific community. As most of us know, California Proposition 71, the California Stem Cell Research and Cures Initiative, was passed on November 2nd, 2004. The Proposition mandated the state to allocate \$3 billion funding to support stem cell research in California. With this ballot measure being rapidly implemented, California, and San Francisco in particular, is rapidly transforming into the center of stem cell researches in the world.

Four leading scientists in the San Francisco bay area presented their most recent research work in the stem cell field. The scientists came from leading academic laboratories, private research institute, as well as biotechnology industry. The presentations covered a broad range of stem cell research, from bioengineering to human therapeutics, from cardiovascular diseases to neuronal degeneration disorders. The following is a brief summary of the speaker's biographies and their presentations.



Dr. Joseph Gold, Associate Director for stem cell biology of Geron Corporation. Joseph received his Ph.D. in Cell and Developmental Biology from Harvard University in 1990. He conducted his postdoctoral research in Dr. Roger Pedersen's laboratory at UCSF where his work focused on early mammalian development and genomic imprinting. He joined Geron Corporation in 1996 and is currently Associate Director of Stem Cell Biology. His work focuses on the generation and characterization of cardiomyocytes from human embryonic stem cells for in vitro and therapeutic applications.

Dr. Gold gave an exciting talk on "**Human Embryonic Stem cells: Moving from Bench to Bedside for Cardiovascular Disease**". After a brief introduction of stem cells and human diseases due to cell loss, Dr. Gold focused on human heart diseases and its cell therapy options. He talked about the origin of human embryonic stem cells and their characterization and biomarkers in cell culture. He also showed the pluripotency of the stem cells by presenting the evidences of stem cells forming all three germ layers. Dr. Gold also discussed the special requirements for moving the stem cell research from laboratory into clinical applications. In the main section of his talk, he discussed a new human embryonic stem cell line being used in his laboratory at Geron Corporation. His stem cell line was derived without the need of mouse feeder cells. This will have major advantages for future therapeutic applications. Dr. Gold discussed that stem cell line in details, including its cardiac differentiations, expressions of all major biomarkers, the cell preparation procedures for transplant, electrophysiology of derived cardiac myocytes etc. Moving toward therapeutics, Dr. Gold presented some encouraging early results of animal studies in a rat model. At the end of his talk, he discussed the concept of therapeutic clone for human therapeutics. His work has been recently published in Nature Biotechnology and Cancer Journal



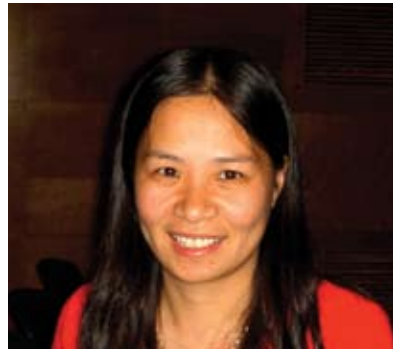
Vanessa T Angeles, graduate student from Dr. Renee Reijo Pera's lab at UC San Francisco. Vanessa received her B.S. in 2001 from UC San Diego, majoring in Animal Physiology and Neuroscience. From 2001~2003, she conducted genetic studies in The Salk Institute for Biological Sciences. Currently, she is a Ph.D. candidate in the Department of Obstetrics and Gynecology at UC San Francisco. Her research focuses at Characterizing gene expression and function in human Embryonic Stem Cells (hESCs).

Representing Dr. Reijo Pera's lab, Vanessa presented her own work as well as some other current research projects in the Human Stem Cell Biology Program of UCSF. Her talk entitled "**Human Embryonic Stem Cells: Potential Beyond Expectations**". She first gave a thorough overview of the stem cell field and particularly on human and mouse embryonic stem cells. She then focused on in vitro gametogenesis of stem cells. She discussed the processes of germ cell development, and gave some evidences of spontaneous in vitro gametogenesis from cultured mouse embryonic stem cells. She discussed the concept of genomic imprinting and its life cycle. At the end, she discussed the potential applications of stem cell gametogenesis, especially on clinical infertility treatment potentials.



Dr. Song Li, Associate Professor, Department of Bioengineering of UC Berkeley. Song Li received his B.S. and M.S from Peking University, China in 1988 and 1991, respectively, majoring in Mechanical Engineering and Biomechanics. He then received his Ph.D. in Bioengineering from UC San Diego in 1997. After a brief but successful research career in UC San Diego from 1997~2000, Dr. Li joined the UC Berkeley faculty team as an assistant professor in the Department of Bioengineering in 2001. Currently, he is also the Managing Editor in "Frontiers of Bioscience" for its Stem Cell Engineering volume.

Dr. Li is one of the leading researchers in the field of stem cell bioengineering and tissue engineering. He presented his recent work on "**Stem Cell Engineering for Cardiovascular Regeneration**". Similar to Dr. Joseph Gold, Dr. Li's interest is also in cardiovascular applications of stem cell studies. But his approach is rather different. Instead of injecting cardiac myocytes into the tissue, Dr. Li tries to grow tissue in vitro. Dr. Li's presentation painted a futuristic picture of tissue plant where human tissue, even whole organs can be generated in vitro from stem cells, and human diseases can be cured by transplantation of these tissue or organs. He gave the first example of tissue engineering on blood vessel formation. Through a series of stimulations, human bone marrow stem cells can be turned into blood vessels. The stimulations stem cell differentiation needed include both TGF- β growth factor and mechanical stimulations. The second example of tissue engineering Dr. Li presented was on epicardial patch formation. In the presence of supporting scaffold, stem cells can differentiate into patch-like tissue, which can be used on cardiac tissue repairing.



Dr. Xianmin Zeng Assistant Professor, Buck Institute for Age Research. Xianmin Zeng received her M.Sc and Ph.D. in molecular biology both from Technical University of Denmark, Denmark, in 1997 and 2000, respectively. Before joining Buck Institute, she conducted two postdoc trainings both were in the NIH system. She had her first postdoc training in molecular immunology in the National Institute of Aging and the second in stem cell biology and neurobiology in the National Institute on Drug Abuse.

As our last speaker, Dr. Zeng gives a glimpse view of the future on the treatment of degenerative neuronal diseases. Her talk entitled “**Potential Clinical Applications of Dopaminergic Neurons Derived from Human Embryonic Stem Cells**”. Her research tackles the most difficult work for human tissue repair – replacing neuronal tissue. Dr. Zeng showed that human embryonic stem cells could be turned into dopaminergic neurons, through a series of differentiation. The differentiated cells demonstrated all the correct biomarkers. Electrophysiological studies of the differentiated cells show characteristic dopamine responses too. This research revealed a potential bright future for degenerative neuronal diseases treatment, such as Parkinson’s Disease therapy et al.

Chiron Corporation generously provided its Auditorium for the event. All presentations were well received by SAPA-West members and their friends. All but one of these four presentations have been converted to PDF format and available for references by our members on SAPA-West’s website. Interested members can find these talks at <http://www.sapa-west.org/sapawest/feventslist.jsp> under the title of **Stem Cell Research**.



Beijing Tri-Prime Genetic Engineering Co., Ltd.

The Pioneer, Standard Initiator and Consolidator of Chinese Biotech Industry

As the first venture capital back and one of the first biotech companies in China, Beijing Tri-Prime Genetic Engineering Co., Ltd. is a fully integrated biopharmaceutical enterprise. Capitalized on China’s first molecular cloning product, and the best selling biologic, interferon, Tri-Prime led the Chinese biotech industry go through countless hurdles. The significant milestones include



1. Pioneer development of biopharmaceutical products and processes from laboratory to commercial scales; Navigating the Chinese regulatory and legal systems to obtain approval; Out-licensed nine biologics to a range of biotech companies to jump start the industry, revenues of these products consisting 50% of total biologic sales in today’s Chinese market;
2. Setting up the first Chinese GMP standards for biopharmaceutical product manufacturing; Standardized the Chinese interferon market by applying modern marketing strategies and techniques; and
3. Successfully steering the ever-changing Chinese distribution system, then competing and winning a fierce price war in a biogeneric market – Tri-Prime climbed to the top in market shares among all Chinese interferon makers by the first quarter of 2005, despite a few years late to the market.

Today, Tri-Prime is a premier biopharmaceutical company with product mix now including pharmaceuticals, vaccines and diagnostic kits. Looking ahead, Tri-Prime is poised to capture a bigger share in the explosively growing Chinese biotech market. We are actively pursuing mergers and acquisitions strategies to consolidate the Chinese biotech industry. We are also expanding our collaborations with overseas partners to acquire technologies and products, as well as for market expansion. It would be a great opportunity for potential international biotech partners and investors to ally and cooperate strategically with Tri-Prime, the Consolidator of the Chinese biotech industry, to achieve ever-higher excellent performance.

