A Review of the Conference of the Clinical Translation of Stem Cells

Dr. Ron Shane, Dr. Andrei Gherghina

This conference was concerned with actual viable protocols in regenerative medicine, which are applicable to clinical practitioners. It was produced by Dr. Allan Wu and Dr. Enal Razvi. There was a prodigious interaction of educated scientists and clinicians with speakers; and this conference in general was highly informative. Unfortunately, stem cell therapies are not yet clinically actualized to where they will change the current standard of care for most medical practitioners. Ingrid Caras from the California Institute for Regenerative Medicine spoke about how research endeavors in this discipline funded by taxpayers of California has led to an escalation in our understanding of molecular biology. She noted that the FDA approved clinical translational strategies are at least two decades from being instituted into western medicine.

Dr. Mark Berman, Dr. Joe Purita, and Dr. Dennis Lox presented data on the effectiveness of autologous stem cell therapies for the treatment of osteoarthritis. All these clinicians are extracting adipose tissue from a patient, and separating out what has been referred to as the stromal
vascular fraction, which contains many kinds of partially differentiated autologous stem cells. There are many methodologies which were discussed at this conference for separating stem cells from adult adipocytes.

Currently, clinical researchers have not yet established if the method of extraction or the strategy for liberating stromal vascular fraction from an adipose tissue matrix makes a difference in terms of the effectiveness of a particular clinical protocol. Dr. Mark Berman and Dr. Lander have executed over 800 procedures in California taking the stromal vascular fraction, and injecting this autologous substrate into arthritic knees, shoulders, and hips in order to attenuate deleterious pain syndromes in a diverse array of patients.

Dr. Berman has stated that his protocol has enabled a patient who would otherwise be confronting a partial or full prosthetic device in the knee to avoid those highly invasive orthopedic surgeries where an individual's quality of life is then highly compromised. Dr. Lander and Dr. Berman purported that most of their patients experienced an absence of pain in their pathogenic joints; in some cases there was a regeneration of hyaline cartilage. The success of this procedure is correlated with the efficaciousness of autologous adipose progenitor
cells for ameliorating inflammatory and degenerative cascades within pathological joints. These stem cell therapies are not likely in most instances to activate chondrocytes to generate new cartilage formation; however, the virulent toxicity of the interarticular milieu is attenuated by the stromal vascular fraction. This physiological phenomenon changes the transcriptional and translational behavior of chondrocytes where cartilage synthesis is now possible in many phenotypes. Thus, further tissue degeneration ceases, and inflammatory morbidity is tempered.

The overall biological environment becomes more homeostatically stable with the injection of the stromal vascular structure into a compromised joint, and this enables in some patients a certain degree of cartilage genesis. The effectiveness of autologous stem cell therapies in the interarticular environment enables these progenitor cells not to migrate, and it appears that these grafted particularly undifferentiated cell lines are not impeded or modulated by this environmental milieu, since there is limited blood supply into joints.

This regenerative procedure being executed by Dr. Berman and Dr. Lander is anecdotally speaking highly efficacious without any deleterious side effects. Dr. Lox and Dr. Purita are utilizing a myriad of
other factors when injecting into the interarticular space whereas Dr. Berman has clinically indicated that it is not necessary. Dr. Purita, a board-certified orthopedic surgeon practicing in Florida, is employing mesenchymal stem cells from bone marrow with adipose stem cells when treating arthritic joints. Many clinicians like Dr. Chris Centeno believe that mesenchyme stem cells from bone marrow are a superior regenerative strategy for mitigating the symptoms of osteoarthritis.

Currently, there is not any study which has shown whether mesenchymal stem cells from bone marrow are superior to adipose stem cells. Clinical studies are certainly needed to document the efficacy of this promising protocol. Dr. Purita and Dr. Lox both utilize platelet-rich plasma with their stem cell matrix, and IGF-1 as well as other cytokines, which are effective for mitigating inflammation. Furthermore, Dr. Purita is also employing in certain instances actual fat tissue into the compromised joint as a scaffold. Dr. Purita stated that he does not know which particular treatment strategy is actually inducing the beneficial clinical outcomes, or if there is a synergy amongst these distinctive protocols. These treatment protocols for osteoarthritis appear to have excellent clinical outcomes in many patients without any side effects.
The grafting of stem cells either allogeneic or autologous for many diseases without a scaffold has been shown in the preceding 15 years not to have any clinical efficacy; and should be abandoned as a clinical strategy, and this was the consensus of opinion amongst many speakers at the conference. Stem cells which were grafted into the left ventrical after a myocardial infarction only slightly improved the quality of life where the patient was able to walk 200 yards more as compared to the placebo group. Many researchers have attempted to use various stem cell lines to treat Parkinson’s disease, Alzheimer’s, and Type 2 Diabetes, without any kind of positive clinical outcome. Many scientists in regenerative medicine have found that stem cells have not been able to adhere to a problematic tissue region; and more importantly, the particular environmental niche does engender the grafted cell lines to immediately differentiate into a particular adult cellular system. Thus, the auspicious cytokines and trophic factors are no longer expressed.

There have been many studies in mice that have demonstrated that blood from a younger animal induces ameliorative changes in the older mouse in terms of muscle and neurophysiological genesis. Conversely, blood from an older mouse will engender deleterious changes in a younger phenotype. Stem cells when grafted without a
scaffold are only temporarily effective; and their peptide and trophic factors are responsible for their edifying cellular modulation. Dr. Shane presented intriguing findings which are consistent with Dr. Rando’s research efforts at Stanford; and the recent studies at Harvard are involved with blood transfer of a younger phenotype into an older organism. This research scientist stated that he is procuring a multitude of different kinds of peptides from embryonic stem cells, and injecting them into an older mouse phenotype. His microarray analysis revealed that the overall genome of the older treated mouse was concordant with a younger untreated phenotype. Dr. Shane purported that paracrine peptides from nascent stem cells are the most viable way of treating many disease symptomologies related to aging. Thus for this researcher particular stem cell lines are the new factories for the 21st century for producing medical therapies, which will ameliorate a diverse array of pathologies engendered by cytokine dysregulation associated with aging.

According to Dr. Shane it is preferable to systemically inject a cytokine matrix into a pathophysiological phenotype than to transfer a younger entity’s blood or graft stem cells. Currently, his research efforts are expanding into larger mammalian species; and he hopes to
demonstrate ostensible translational changes in terms of reversing the virulence of aging. Moreover, Dr. Pettine is utilizing autologous bone marrow stem cells to treat chronic lower back or lumbar perturbation. This clinician used an aspirate of autologous mesenchymal stem cells when he executed intradiscal injections into patients; and they experienced a considerable mitigation of pain. His clinical outcomes are consistent with others who have shown that autologous stem cell sources can temper chronic pain in the lumbar region by modulating deleterious inflammatory cascades. Thus, it is possible that actual cytokine therapies involving hundreds of peptides from stem cell sources may be more effective in terms of inducing hyaline cartilage genesis in a pathogenic phenotype than autologous stem cell therapies.

Dr. Clegg has been working on therapeutic strategies to treat macular degeneration, and he is using scaffolds with differentiated cell lines from embryonic undifferentiated stem cells to replace necrotic cells in the eye. He purported that grafting stem cells without some kind of stable scaffold has very limited merit. Scaffolds can have millions of cells adherent to its surface where it can be surgically placed and inserted to a particular perturbed tissue. This protocol appears to have an interesting efficaciousness; however this regenerative strategy is not
yet medicinally available to patients. In general many biotech companies are developing pragmatic scaffolds for surgical implantation into diseased tissues.

Dr. Wu, Dr. Barbarino, and Dr. Shane led a section on current non-invasive cosmetic therapies which are now available to patients. Dr. Bircoli at this conference stated that after several decades of employing fat grafts to the face and breast that additional stem cell concentrations are not necessary. He also lectured on the new excellent technologies for cryopreservation of adipose tissue for fat grafting related to clinical purposes. Dr. Wu and Dr. Barbarino spoke about the synergy of utilizing fat grafting with Botox and artificial fillers to attenuate facial aging. Fat grafting as stated by these clinicians can be regarded as a scaffold where hyaluronic acid products can be used at various vector planes to achieve and restore youthful volume, as well as induce an aesthetic sculptured beauty to the face.

Dr. Barbarino pointed out that a youthful physiognomy can be achieved with fat and artificial fillers and Botox without the need of invasive facial surgery if the person does not have excessive skin laxity or extreme sun damage. Dr. Shane discussed the benefit of employing PRP treatments with cytokine configurations extracted from umbilical
cord stem cells. His protocol involves PRP injections into regions of facial deflation; and the use of a roller device where the platelets are driven into the dermis releasing their array of trophic agents.

The cosmetic facial benefits of PRP are greatly enhanced by utilizing a cytokine matrix from umbilical cord stem cells. These peptides are likewise propelled through the stratum corneum into various levels of the epidermis and dermis propitiously impacting the transcriptional and translational behavior of a myriad of cell lines. Dr. Shane stated that the use of 250 peptides from a nascent stem cell source is vastly superior to the limited trophic factors secreted by high concentration of platelets. Human placental extract can also be delivered into the dermis with either a needle pen or roller if a patient has excessive systemic inflammation.

Many pathologies are associated with an escalation in the expression of inflammatory interleukins; and a diverse array of cytokines and stem cell therapies have been shown to be medicinal in terms of assuaging cellular virulence and degeneration. The translational benefits of regenerative therapies are still limited; however the global scientific community is ardently trying to improve a patient’s quality of life by utilizing their medicinal research efforts into propitious
therapeutic strategies. This conference was impressive both in terms of the scientific acumen of the speakers as well as the effectiveness of the regenerative clinical applications as therapeutic strategies. Anyone interested in regenerative medicine should attend this conference next year.