Platelet Rich Plasma (PRP) and Very Small Embryonic Like Stem Cells (VSEL Cells)

The following is from "The Regeneration Promise; The facts Behind Stem Cell Therapies"

"We all have platelets (small particles which promote blood clotting when needed) in our blood. Platelet rich plasma (PRP) is a technology which concentrates these platelets, which can then be used clinically to treat painful joints and muscles, to promote wound healing, and in many other applications, which are in clinical trial.

The process of collecting and preparing PRP is relatively simple. Around 20- 30mL of venous blood is collected and then centrifuged in a special PRP tube which separates the cells from the PRP. The PRP is usually produced from the patient who is seeking treatment i.e. it is an autologous procedure using th,e patients' own blood with minimum manipulation. PRP therefore, it attracts very little attention in terms of regulatory authorities.

The PRP can then be taken and used in whatever way is needed. Since this is a very simple process, almost any clinic or laboratory could produce PRP and offer it as a treatment route. The 'rogue' clinics have started to offer this treatment as a therapy for almost everything!

One of the most exciting areas of clinical research in regenerative medicine is an area called photoacoustic therapy. This is the impact of light and sound on biological systems and especially stem cells. One of the leading pioneers of this technology is Dr. Todd Ovokaitys (known to his friends and colleagues as Dr. Todd) based at a company called Qigenix in California. Dr. Todd and his colleagues have developed a medical laser, which produces specially modulated laser light, which appears to 'stimulate' or 'activate' stem cells to carry out repair more quickly and more efficiently than without exposure to the laser. The laser also seems capable of directing stem cells to where they are needed in the body to carry out repair and regeneration. This is achieved by applying the laser (which is a totally harmless low energy red laser especially modulated for this application) to the patient in the area where the repair is needed e.g. to the area of the heart in heart disease and so on.

This research and development using the laser have focused on a group of stem cells known as Very Small Embryonic Like (VSEL) stem cells. There was initially some debate about whether or not these VSEL stem cells actually existed but they have now clearly been identified in peripheral blood in the veins ofus alland in many other organs and tissues in the body. They are called VSEL stem cells because they are very small (diameter of 1-4 millionth of a meter) and have similar surface markers as embryonic stem cells.

It isproposed that VSEL stem cells are_'tissue forming' stem cells in the same way as embryonic stem celle and therefore theoretically capable of making any of the different tissues and cells in the body. These VSEL stem cells are found in everyone in our circulating blood, but in normal circumstances they seem to be biologically inactive. It is thought that VSEL stem cells may be a remnant of our biological development, which were active in the developing fetus but become no longer active shortly after birth and for the rest of the persons life. There is also a thought that as VSEL stem cells are found in the bone marrow, they may be responsible for creating the 'blood-forming' stem cells found in the bone marrow. This has yet to be confirmed, but it seems likely that this may be happening.

The best and easiest way to isolate these VSEL stem cells is to collect some peripheral blood from a vein and process it in a centrifuge to produce a fraction of the blood known as platelet-rich plasma (PRP) as described above. This PRP fraction contains high numbers of platelets (components of the blood involved in blood clotting) and also high numbers of VSEL stem cells. The next step in the process is to shine the modulated red light medical laser at the PRP for about 3 minutes in total to 'activate' the VSEL stem cells, which can then be returned to the patient to either a specific site, e.g. the

knee joint or a specific organ or back into a vein. The laser can then also be applied to the area where treatment is needed to attract the stem cells to where they are needed and instruct them to remain in that area.

The fact that VSEL stem cells are very small means that if they are returned into the patient into a vein then they are small enough to get to any site in the body, including the brain. This is not the case with other stem cell types such as standard 'tissue forming' stem cells, which, if injected into a vein will almost all be caught up in the tiny blood vessels in the lung.

My own research on VSEL stem cells, in collaboration with Dr Todd, has shown that when modulated laser radiation is used on PRP (VSEL stem cells) it causes the VSEL stem cells to increase in number very rapidly and this could be part of the activation process.

Dr Todd has a lot of data from a Phase I clinical trial and patient case studies on the clinical use of 'activated' VSEL stem cells. This includes the use of activated VSEL stem cells in the treatment of neurological disease (e.g. Parkinson's disease and multiple sclerosis) in nerve damage (e.g. spinal damage following an accident or injury) and in a clinical trial using 'activated' VSEL stem cells to treat life- threatening heart failure. Patients in these and many other groups seem to benefit from 'activated' VSEL stem cell therapy. In the heart failure clinical trial, all patients seemed to benefit from the treatment which helped them all to resume anormal life and the benefits seem to be stable over time.

Laser activated VSEL stem cell therapy is not a 'cure'. No such claims have ever been made. Nevertheless, laser activated VSEL stem cell therapy does seem to be a benefit to many patients in terms of increasing their quality of life. It appears that the most benefit is seen when the treatment is used in the early·stages of disease or trauma, but once again more work is needed to confirm this observation. It may well be true based on the fact that scar and fibrous tissue is common in persistent disease but is not so common at the start of the disease. The scar and fibrous tissue may be reducing the effectiveness of any stem cell therapy. The benefit of laser activated VSEL stem cells is also enhanced when the patient is treated in a holistic way i.e. combining all the things the patient needs rather than just an injection of stem cells. Much more basic scientific research and further detailed clinical trials are needed on this technology but it is an area of great excitement in regenerative medicine which certainly deserves a mention in this book. It has the potential to make an enormous contribution to the Regeneration Promise in the future, but only time will tell.”