

therapy. However, in recent years there have been a growing number of health practitioners and clinics offering these treatments in Australia and New Zealand. It has been suggested that as many as 60 clinics in Australia are offering stem cell treatment for various diseases and conditions. Although Ireland, Singapore, the Cayman Islands and the Bahamas have more clinics per capita than Australia, Australia has a greater number of stem cell clinics per capita than the USA.

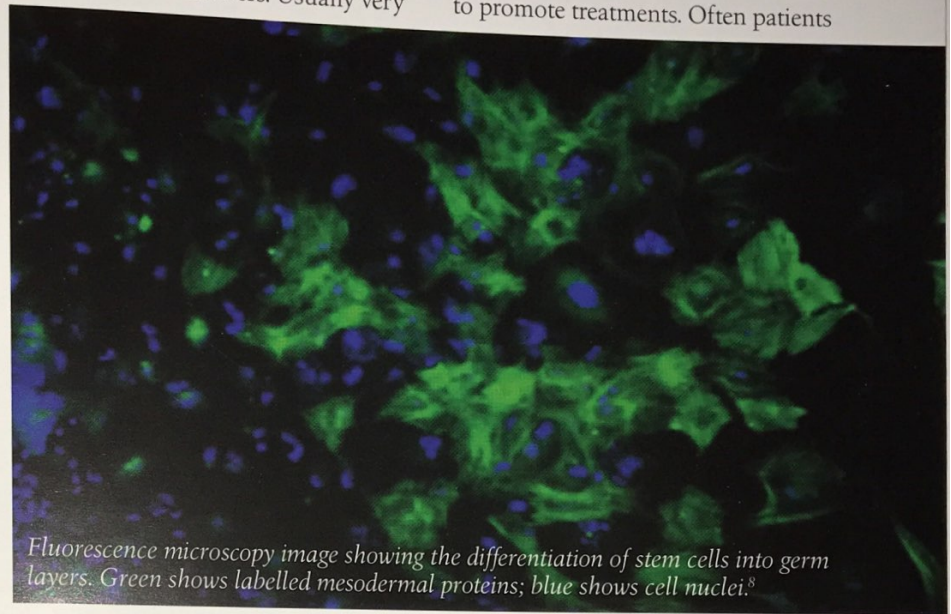
Web searches identified 16 stem cell clinics in Australia and seven from New Zealand, which were advertising their services online. Treatments are offered across a range of indications across all surgical specialties.

Stem cell treatments for degenerative bone diseases (e.g. osteoarthritis, degenerative disc disease, tendinopathies), sports injuries (bone, joint, tendon and cartilage injuries) and chronic pain (joint or back pain) were commonly treated within Australian and New Zealand stem cell treatment centres. Cosmetic and anti-ageing procedures also involved stem cell treatments. Less commonly advertised stem cell treatments were for Parkinson's disease, multiple sclerosis, autism, Alzheimer's disease, dementia or urological conditions.

The most common source of stem cells was adipose-derived stem cells (ASC) harvested following abdominal liposuction. Bone marrow-derived stem cells (BMSC) treatments are offered by some clinics for osteoarthritis and tendinopathies, although normally

general, treatment centres process stem cells within a few hours (same day processing) on the day of treatment. Some centres offer two schedules of cell preparation: same day or multi-week cell processing. The longer timeline would allow for cell growth to increase cell numbers. Usually very

while no robust scientific evidence is provided to support safety or efficacy. The use of testimonials in this manner may breach the Australian Health Practitioner Regulation Agency Code of Conduct for clinicians, which does not allow using patients' testimonials to promote treatments. Often patients



Fluorescence microscopy image showing the differentiation of stem cells into germ layers. Green shows labelled mesodermal proteins; blue shows cell nuclei.<sup>8</sup>

little detail is provided as to how cell processing is done.

Treatments are expensive, costing between \$9,000 to \$60,000 per treatment. These services are not reimbursed by Australian or New Zealand governments (e.g. MBS in Australia), or by private health insurance, this cost is paid by the patient.

Patients with severe diseases and conditions, especially when previous treatment options have provided little benefit, may consider unproven stem

decide to proceed with these treatments without seeking clarification or a second opinion.

For the average patient there is a significant degree of ambiguity in whether the stem cell treatments are proven, experimental, or part of a registered clinical trial. The National Health and Medical Research Council provides clear information to patients regarding stem cell treatments that includes which stem cell treatments are proven, and highlights information pertinent to participating in a clinical trial.<sup>9</sup>

Regardless of whether there is any 'proven' efficacy or not, many may

ask the question that surely there is little harm in providing the patient with their own cells? An example of the potential risks posed by stem cell therapy, and concerns regarding how well patients are informed prior to consent to stem cell therapy were recently highlighted in the findings of a NSW coroner.

In July 2016, the NSW deputy coroner found that a 75-year-old ▶

**Although the technology is moving quickly and there is huge potential in the use of stem cells, many questions remain regarding their use.**

these conditions are treated using ASC by most centres. Some centres were not clear as to the stem cell source they use for treatments.

From a review of the websites and the information they provide about their services there is a large amount of variability in the methods used to provide the therapies. This is particularly the case for stem cell isolation and manipulation. In

cell treatments. These patients are often vulnerable, having tried and failed many other alternative treatments. Usually they are not referred to stem cell treatment by the specialist who treated their condition. Instead, patients are self-directed after reading an advertisement or article. Previous treatment recipient testimonials are used by clinics to support benefits of a treatment (anecdotal evidence)