

**SUBMISSION TO THE SENATE COMMITTEE INQUIRY ON THE LEGISLATIVE
RESPONSE OF THE LOCKHART REVIEW**

I would like to submit the following written document and would be willing to participate in the public hearing of the committee assessment of the Lockhart review and human cloning.

As a scientist and clinician I would like to address the following areas:

1. The statement that human somatic cell nuclear transfer cloning technology is necessary to generate patient specific and/or disease specific cells for the study of human diseases and treatment.
2. Impact of human stem cell and human cloning research on patients, carers and support organizations.
3. Impact of human stem cell research and human cloning research on the community as a whole.

1. Human patient specific and disease specific stem cells:

Cell specific, or cells representative of a particular disease are highly desirable. Such cells may potentially enable the study of the mechanisms generating the disease and the response to drug treatments. Intuitively they may lead to better treatments. Unfortunately, many diseases have different subtypes, sometimes multiple types and causes. Consequently, many cells and clones will be required to truly study each disease and patient. Indeed many cells would be required to avoid immune rejection.

As cloning is extremely inefficient it has long been recognized that there will not be enough eggs to permit the achievement of the goal of obtaining disease specific or

patient specific stem cells from human cloning by Somatic Cell Nuclear Transfer (SCNT) and use of human eggs. This fact has been known for many years. Furthermore, insertion of human genetic material into animal eggs is scientifically possible but will not allow cell replacement strategies to treat diseases and introduces animal genetic material into human genetic material thereby fundamentally altering the molecular genetics and physiology of the hybrid. Hence it is fundamentally different to a pure human clone. Consequently, it will not be truly representative of the disease not patient it was derived from and not satisfy the broad aims of science and demands of our community. Fortunately fully differentiated adult cells can be reprogrammed to produce every cell type such that they have totipotent potential (Willmutt et al 1997). The factors permitting reprogramming have recently been described (Takahashi and Yamanaka 2006). So for 10 years it has been known that adult cells can be reprogrammed.

Despite erroneous statements to the contrary, adult stem cells exist and from a single person can be turned into multiple different cell types in animals as well as humans (Murrell et al 2005). Importantly disease specific and patient specific adult stem cells have already been generated in Australia from patients with different diseases. Each disease type attempted has resulted in stem cells being obtained and cells have been generated which involve the disease cell type as well as others.

Thus patient and disease specific cells already exist. They are easily obtained and can be grown in large numbers. Thus it is not necessary to clone human material by SCNT nor is it necessary to use Embryonic Stem (ES) cells. It can also be argued that it is not necessary to generate ES cells which then must pass back through to adult stem cells and adult progenitors to give a cell type. It is simpler, more efficient, proficient, safer and more sensible to use the AS cells initially.

In my opinion, erroneous statements that adult cells are limited in their capacity to generate multiple cell types are irresponsible, misleading and lack probity.

2. Impact on patients, carers and support organizations:

It is a disturbing fact that promises of cures through human cloning has created unrealistic expectations amongst patients and the community, thereby generating false hope in vulnerable individuals. This is immoral.

As a busy practicing medical specialist, every day patients are expecting stem cells and cloning to cure their disease. This is what they have been told in the media. The psychosocial impact of these hopes cannot be understated. Indeed when those attempting to instill scientific truth are heeding caution they are seen as the enemy to cures engendering an "Us versus Them" stance. This is wrong on multiple levels. My impression is that such irresponsible statements are not scrutinized and give the impression of acceptance as fact and that wishful thinking is seen as an indication to proceed. This is unscientific. In a society of limited resources it is more sound to stick to the well worn path of basing decisions on facts not fanciful statements no matter how seemingly unattractive and undesirable. Facts are stubborn and provide a sound realistic basis for progress. A major point in this inquiry is do we need human cloning to generate disease and patient specific stem cells. The facts do not support this notion.

3. Community impact:

It is my opinion that it is appropriate that the community expects its use of limited resources in research to find cures and relieve suffering. It is inappropriate that the communities understanding of achieving these goals is being generated by paid lobbyists, influencing the media and thus peoples opinions on the road to achieve these aims. Parliamentarians are familiar with lobbyists, median influences, erroneous

statements and hard decision making. Unfortunately many statements regarding cloning are not arguments, nor are they based on facts.

We have observed erroneous statements in Parliament house in the previous debate on the need to have ES cells. We have observed lies and fraud involving ES cells and cloning by individuals with unlimited funds, cloning technology and access to human eggs and embryos. In countries with the above there have been embarrassing failures and wasted resources, including human resources. This lack of integrity and probity is not consistent with the core of our own society nor National Health and Medical Research Council. Scientists and clinicians have also been fooled by fraudulent work by desperate teams and indeed substantial components of the Lockhart Review were unknowingly based on scientific fraud. Such fraud is not an isolated phenomenon in medical science and is not restricted to monetary gain but notoriety and fame as seen in the case of the Korean fraud.

In contradistinction there are multiple clinical trials already underway in multiple countries using adult stem cells and not requiring human cloning based on SCNT. A modicum of internet searching skill by non-scientists is all that is required to confirm this. So I think human cloning is neither necessary nor sufficient to satisfy the demands of our community in generating disease or patient specific stem cells. This is already underway in our country and this fact is something our nation should be proud of and our parliamentarians aware of in this unnecessarily difficult debate. The broader issue of government involvement in research is not the point of this inquiry and actually draws a red herring across the argument. The point is the necessity of human cloning in this issue. It is not necessary.

References:

1. Murrell W. et al (2005) *Developmental Dynamics* 233:496-515
2. Takahashi K and Yamanaka S (2006) *Cell* 126:663-676
3. Willmut I et al (1997) *Nature* 385:810-813

Appendix 1