Speech by

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## RESEARCH INVOLVING HUMAN EMBRYOS AND PROHIBITION OF HUMAN CLONING AMENDMENT BILL

**Mr LANGBROEK** (Surfers Paradise—Lib) (2.30 pm): When does life begin? This contentious question has been argued by scientists, philosophers and religious leaders for decades. In my lifetime, the enigmatic question has arisen in many contexts, from the 1973 definitive US Supreme Court decision in Roe v Wade, the debate we had in the seventies and eighties about the legal, ethical and moral considerations of in-vitro fertilisation or IVF treatment, to today here in this parliament where we will decide on the future of embryonic stem cell research.

Few issues elicit such strong emotion, as we will see in this debate. That is because few of the questions we are faced with answering on a daily basis go to the root of our very being. Few questions challenge our own fundamental values and beliefs about what is right and wrong in the way that the right to life does. It is an important debate and one which cannot and should not be driven by party politics. Upon hearing the many and varied opinions and arguments on the issue, we have the opportunity to decide, and we have the opportunity to decide not on how our party colleagues vote but on what we personally think is right and what we believe is important.

It is a significant decision and one which I can say with certainty has not been taken lightly by any one of us. The effect of this bill will facilitate further scientific research into the human condition by legalising, albeit within rigid limits, some research activities that involve human embryos. As the health minister and honourable member for Stretton advised the House, this is a rapidly developing area of technology that has demonstrated significant potential for the development of therapeutic treatment for hundreds of debilitating injuries and diseases. However, it is difficult to consolidate the potential benefits of embryonic stem cell research with the serious ethical consequences such research would confront.

As elected representatives, we have been charged with the task and the responsibility of making that determination for all Queenslanders. Here we must decide on behalf of four million people what we are willing to accept and what we are willing to risk to potentially save lives. Depending on one's personal answer to my opening question, this debate may well be an agonising trade-off. Effectively, which life does one consider to be more important: an existing life plagued by illness and disease or a potential life, with all the promise and hope that shrouds a newborn? As I have said, this will not be an easy debate. Few issues in our political careers will matter more than the outcome of this conscience debate. I am extremely grateful and humbled that I have the opportunity to contribute to the discussion.

In a sense we are fortunate that this extremely emotive issue has been decided by our federal counterparts. We have also had the benefit of witnessing the outcome of the debate raging in other states. Before I address the current bill, I think it is necessary to consider the history of the debate in Queensland and wider Australia.

The impetus, indeed the embryo of the current embryonic stem cell research debate, has its origins in Canberra where, at the eleventh Council of Australian Governments meeting, the Commonwealth, states and territories agreed to introduce nationally consistent legislation to ban human cloning. Among the

issues discussed by the council, controversial embryonic research was also addressed, with plans set in place for laws that would enable limited human embryonic stem cell research. The Commonwealth signalled its intention to introduce the legislation, which the states and territories agreed to carbon copy into their legislative regime.

The Commonwealth government passed a Prohibition of Human Cloning Act and the Research Involving Human Embryos Act in December 2002. The acts set the boundaries for stem cell research in Australia. Under the Commonwealth legislation, and indeed in all of the ensuing states' laws, the process of somatic cell nuclear transfer, SCNT, for the purpose of reproductive cloning was completely banned.

The second proponent of the legislative regime, the Research Involving Human Embryos Act, opened the door—but only slightly—for human embryo scientific research in Australia. Effectively, the law would allow excess embryos created for the purpose of assisted reproductive technology, ART or more commonly known as IVF, which would otherwise have been destroyed, to be used for scientific research under a strict regulatory scheme. It was the Australian government's view that research involving the destruction of existing surplus ART embryos should be permitted within strict limits to enable Australia to remain at the forefront of research that may one day lead to medical breakthroughs in the treatment of disease.

As a result of Queensland's COAG commitment, a similar act was introduced to Queensland parliament. The Research Involving Human Embryos and Prohibition of Human Cloning Act 2003 was passed in this place in March 2003 to honour our commitment to the national scheme. The act mirrored the federal legislation, the purpose of which was to regulate the destructive use of human embryos and prohibit all forms of human cloning.

Both the state and Commonwealth legislation mandated a comprehensive review of the acts, which became known as the Lockhart review committee, led by the Hon. John Lockhart AO QC. Among those appointed to assess the efficacy of the law and balance the conflicting public policy positions were Queensland's Associate Professor Pamela McCome, Associate Professor Ian Kerridge, Professor Barry Marshall, Professor Peter Schofield and Professor Loane Skene. Each of those individuals was chosen for their expertise in the fields of medicine, law, science and ethics and each brought meaning to the challenging and sometimes excruciating debate on human embryonic research. I thank all members of the committee for their expertise, leadership and guidance on the issue.

Throughout the six-month review process, the committee weighed more than 1,000 submissions on the matter, which is a telling indication of the importance of the debate to the people of Queensland and this country. Scientists, religious leaders, top jurisprudential scholars and ART experts were widely consulted throughout the review process in a bid to consolidate, as far as is possible, the ethical and moral concerns about stem cell research with the potential research and medical benefits. It was a task akin to the poison chalice because, regardless of the outcome of the review, no party would ever be completely satisfied with the conclusions.

However, the committee did recognise a number of commonly held interests of all the parties: a commitment to social justice and equity, and the responsibility for the care of society's most vulnerable members. Importantly, the committee submitted that these shared interests were reflected in the community's in-principle support for medical research and an understanding of disease, with the aim of one day treating or preventing it. To this end, the Lockhart review committee tabled its report in federal parliament in December 2005, having made 54 recommendations for the improvement of the human embryo research and cloning legislative regime in Australia.

The Lockhart review recommendations concerning prohibitions on developing and implanting embryos, the creation of human embryos by fertilisation, the use of human embryos created by SCNT, among others, were codified in the Commonwealth Prohibition of Human Cloning for Reproduction and the Regulation of Human Embryo Research Amendment Act 2006. These amendments were passed in December last year and recently came into effect.

The amended legislation permits a number of research activities under licence which were previously banned and which the Queensland bill, if passed, will complement creating similar regulations, offences and penalties in Queensland as the Commonwealth. The Research Involving Human Embryos and Prohibition of Human Cloning Amendment Bill 2007 fulfils Queensland's latest COAG commitment to introduce similar amendments to maintain consistency with the national regulatory scheme.

The impact of the Commonwealth law on Queensland is significant in a number of ways. Firstly, under section 51(xxix) of the Australian Constitution—which is the external power provision—the Commonwealth has the ability to legislate comprehensively in this area as a result of international interest in embryonic stem cell research and human cloning. This means that the federal government has the constitutional authority to enact laws governing the science nationally. In addition, section 109 operates so that where a law of a state is inconsistent with Commonwealth law the state legislation is deemed invalid to the extent of the inconsistency and the Commonwealth legislation prevails. The constitutional effect is that,

if Queensland legislation is not amended, the activities that are currently banned in Queensland will still be able to be carried out in Queensland by persons licensed under the Commonwealth regime.

The offence provisions contained in the bill, which allow for penalties up to 15 years imprisonment for offences, will not apply. While these penalties are provided at a federal level, if the bill does not pass in Queensland the enforcement of the Commonwealth legislation will be predominantly a Commonwealth responsibility.

The bill currently before the House clearly forms part of national scheme legislation. In April this year, Queensland ratified a notice of variation to the intergovernmental agreement to renew our commitment to nationally consistent arrangements for the regulation of human embryo research and prohibition of human cloning. There are a number of problems that arise out of such legislation schemes, which the Scrutiny of Legislation Committee acknowledged in its report on the bill.

The concern with Commonwealth legislation operating outside the limitations of Queensland law is that it tends to undermine the institution of parliament. Gold Coast Bond University professor, Gerard Carney, warned against executive federalism where the federal government formulates the scheme to the exclusion of other legislatures. This is why I believe that it is necessary that this debate rages in our own parliament regardless of the constitutional limitations we face, because to a certain extent we do have the opportunity to set the boundaries in our own state. In addition, regardless of whether the Queensland parliament supports this legislation, Queenslanders, through the National Health and Medical Research Council, NHMRC, may be involved in enforcing the national scheme and will hopefully, in years to come, benefit from this research. Passing these amendments will give rise to a new strict regulatory scheme in Queensland as well as create a new series of criminal offences in Queensland with respect to human embryonic cloning.

As I mentioned, in bringing this bill before the House the health minister honours Queensland's COAG commitment to introduce complementary legislation. Victoria has already passed corresponding amendments to their Infertility Treatment Act 1995, as has New South Wales. Other states are undertaking a similar process of assessing the merits of this reform.

I would like to take a moment to address this bill and outline the amendments it seeks to achieve. The Research Involving Human Embryos and Prohibition of Human Cloning Amendment Bill, if passed, will allow the restricted use of human embryos for research purposes under licence. The bill reiterates a blanket ban on human cloning. As the minister noted in his second reading speech, the bill would expand the range of research activities which may be carried out under licences issued by the NHMRC Embryo Research Licensing Committee. I will elaborate on the committee's licensing process shortly. Firstly, I would like to extend my sincere thanks to the experts, including the Lockhart report contributing author Professor Loane Skene, Griffith University Professor Alan McKay-Sim, Queensland Fertility Group doctor David Molloy, Professor Warwick Anderson of the NHMRC, and Queensland Health's Professor Andrew Wilson who held an information forum recently on this bill.

The Australian Stem Cell Centre has also been instrumental in helping me form my own opinion on stem cell research and understand the implications of this bill. The centrepiece of this debate is stem cells. A stem cell is an unspecialised master cell from which any of the body's 200 cell types can develop, a process known as differentiation. Stem cells retain the ability to renew themselves through cell division thus stem cells play a critical role in growth and development by providing new cells as well as replacing and repairing damaged tissue. There are three types of stem cells, one of which directly relates to this bill. Embryonic stem cells come from a four to seven-day-old embryo. Whilst they have the ability to form virtually any type of cell found in the human body, scientists have accepted that they are not capable of developing into a whole new organism. The other types of stem cells derive from embryonic germ cells and adult stem cells, the latter of which we will hear a lot more of during the course of the debate.

Stem cells have been identified as having significant potential in many areas of research and medicine. As the Australian Stem Cell Centre has noted, embryonic stem cells, those which this bill concerns, could be beneficial in the study of human development and how cells differentiate and function. Researchers hope that through the careful and controlled study of embryonic stem cells they will find answers that may lead to the prevention and treatment of abnormalities and diseases which plague human health. This bill, if enacted, would expand the areas of research legalised in Queensland in order to allow scientists and researchers to explore these possibilities.

As members will be aware, embryonic stem cell research is a highly contentious, highly emotive issue. This is evident in the sheer volume of correspondence members have received in the lead-up to this debate. At the heart of the debate is the argument of what constitutes a human life. The current act defines a human embryo as a live embryo that has a human genome or an altered human genome and that has been developing for less than eight weeks since the appearance of two pronuclei or the initiation of its development by other means. For qualification, two pronuclei are formed in the cytoplasm of an egg in the very early stages of insemination but before the genetic material of the two entities are fused. This occurs

usually only about 12 to 20 hours after the fertilisation of an oocyte by human sperm. The current bill seeks to override the current definition, replacing the aforementioned indicator with a new signpost. Most significant is the new determination of a human embryo as a discrete entity formed after the first mitotic division after fertilisation or a genome which has the potential to develop beyond the primitive streak. While I appreciate that the scientific specifics are difficult to grasp, and I should preface my comments by pointing out that I am not a scientist or a doctor, they are significant because essentially the terminology contained in the act answers that elusive question of when life begins.

Of course, no definition no matter how well formulated could suffice to satisfy the differing views on conception of life. However, the new definition contained in the bill reflects recommendation No. 28 of the Lockhart review committee. The committee considered syngamy, which occurs around 22 hours after fertilisation but is impossible to visually confirm, as a 'better definitional starting point for embryonic development because it is at this stage, when the maternal and paternal chromosomes align, that a new genetic entity is formed'. However, because of the difficulty in determining at what point syngamy occurs, the committee agreed the point at which the pronuclei membrane becomes a human embryo falls at the first mitotic cell division which happens between one to three days after fertilisation.

When one considers the key events of early fertilisation and preimplantation one realises that development between the stages is counted in hours, minutes and seconds. It is exceptionally difficult to determine where the line should be drawn but it is necessary to do so in order to set the parameters for research and determine what is acceptable and what is not acceptable in Queensland and, indeed, Australia. The report found that the current definition contained in Queensland legislation was too restrictive in that it has inadvertently prevented some valuable ART research aimed at improving the quality and practice of in-vitro fertilisation treatment. As a result, the Lockhart committee sought to change the definition of human embryo to recognise that fertilisation is a process and that a human life does not exist until that process is complete around day 14 or 15.

The second point about the changed definition is that it recognises embryos created by artificial means such as by SCNT. Here the indicator is the development of the primitive streak. This occurs around day 15 and it is the first clearly recognisable stage in embryonic development. Without delving into too much detail, it is at this stage where blastocyst-turned-bilaminar embryonic disk cells form a multicellular structure that will uniquely develop into the new individual encoded by the new genome created by the parent cells. Scientists and ART experts confirm that it is at this stage, around day 15, where the entity becomes an embryo proper.

This extension of the definition is vital because of the provisions contained in this bill which authorise prohibited practices under licence contained in division 2 of the bill. None of the research practices permitted under this section by licence are allowed to develop past 14 days. It is unlawful to allow a human embryo to gestate outside the human body beyond 14 days. In a sense, the law has determined that day 14 is when human life begins. Whether this definition accurately reflects the moral inclination or not, it is vital that the terminology in the legislation is legally—thus scientifically and medically—correct as well as explicit and unambiguous. The committee noted the fallacy about definitions. Definitional clarity will not in itself resolve moral concerns. Regardless of whatever language is used, different moral interpretations will be made regarding the status of such entities and the obligations owed to them. I believe, however, that it is more constructive to have a clear operational definition of a human embryo than to leave it open to interpretation. As legislators we have less of a responsibility to dictate what is right and what is wrong than our responsibility to set down the parameters necessary to ensure our legal and moral obligations are upheld and coalesce as far as is practicable.

Turning to the specific clauses of the bill, it is essential to note that these amendments reinforce a total ban on reproductive cloning. I do not think a single person in this parliament will disagree with that. Significantly, all of the stakeholders consulted throughout the review by the Lockhart committee supported a comprehensive ban on reproductive cloning—that is, implanting a prohibited embryo into a woman's body or allowing the gestation period to exceed 14 days. This provision is contained within the new section 7 which also stipulates that no defence exists to justify human cloning for reproductive purposes.

There are three parts to the amendment bill. Part 2, division 1 of the bill imposes an absolute prohibition on some practices, creating criminal offences to this effect. Human cloning for reproductive purposes is contained in this section.

Under this division, creating a human embryo—that is, an embryo created by the fertilisation of a human egg by human sperm for a purpose other than achieving pregnancy in a woman—constitutes an offence punishable by 15 years imprisonment. The 14-day deadline for allowing a human embryo to develop outside a woman's body is also contained in the replacement part 2 at proposed section 10. Other offences under the provision include placing a human embryo clone in the body of a human or animal at proposed section 7; creating or developing a human embryo by fertilisation that contains the genetic material provided by more than two persons at proposed section 9; making heritable alterations to the human genome cell at proposed section 11; collecting a viable human embryo from a woman's body at

proposed section 12; creating a chimeric embryo at proposed section 13; developing a hybrid embryo at proposed section 14; and the placement of an embryo at proposed sections 15 and 16.

Importantly, this division also outlaws the commercial trading in human eggs, human sperm and human embryos. This is one of the many concerns which I have had expressed to me, and I am sure other members of parliament have had expressed to them, in the consideration of this bill. During the last parliamentary sitting I received an informative briefing by Dr Johanna Lynch and Dr Monique Baldwin of the Women's Forum Australia who raised the issue of egg supply. As they suggested, women are central to the debate on embryonic stem cell research. Without human oocytes, scientists would not be able to carry out this kind of research.

Dissenters to the bill point to the potential for the exploitation of women in egg harvesting. There are fears that women may be influenced into donating their eggs at a risk to their health without any foreseeable benefits. The risks involved in human egg harvesting include ovarian hyperstimulation syndrome, which can have grave consequences for women. Approximately 10 per cent of women who undergo IVF treatment experience a degree of hyperstimulation as a result of the chemical inducement to stimulate egg growth. The concern shared by many female dissidents is that women will be asked to assume definite health risks with no demonstrated clinical benefits, particularly if trade in eggs for monetary gain were permitted. However, the new section 18 of the bill outlaws the supply or offer of valuable consideration for the supply of reproductive matter which exceeds reasonable expenses. The bill defines these terms so that there is no uncertainty as to the parameters of the law. What we are legislating strides the boundaries of human understanding. Thus it is imperative that there are no loopholes left open and no stone unturned in drafting such law. This debate is both helpful and necessary in order to guarantee that we have considered all the options and implications of this bill.

Part 2, division 2 is central to achieving the objectives of the bill and also represents the most contentious element of the bill. Herein the bill stipulates the practices which may be authorised by a licence. This section reads as an additional list of offences created under the bill with a subclause which, in effect, will allow otherwise illegal practices to be carried out if and only if the person relying on the exemption is authorised by licence. Therefore, under licence a person may create a human embryo other than by fertilisation or developing such an embryo at the proposed new section 18; create or develop a human embryo containing genetic material provided by more than two persons at section 19; use precursor cells from a human embryo or a human foetus to create a human embryo, or developing such embryo at section 20; and, finally, create a hybrid embryo at section 20A.

I think it is important to note that these are practices which can only be carried out under licence by the National Health and Medical Research Council and the Human Research Ethics Committee. In order to obtain a licence, researchers need to justify the use of human embryos and ensure that they adhere to strict standards pertaining to the use and destruction of such entities. Only a minimal number of human embryos will be permitted under licence. Since Australia embarked on stem cell research, only nine licences nationally have been granted for research involving human embryos and there have been no new licences issued since March 2005.

The proposed new section 18, in conjunction with the amended section 28, gives effect to recommendation No. 23 of the Lockhart report, which supports the use of somatic cell nuclear transfer to create human embryo clones for 'research, training and clinical application'. Arguably, this amendment is the most controversial aspect of the proposed legislation as SCNT technology was used in Scotland to reproduce 'Dolly the Sheep', the first animal to be cloned out of stem cell research. SCNT allows scientists to create a genetic duplicate of a cell which can develop into a separate entity. The nucleus of a somatic cell is subtracted and transferred by injection into an unfertilised egg from which the nucleus has been removed. Through chemical inducement, the discrete entities are fused together to form a new egg which then proceeds to culture in the same way an ordinary embryo does. These embryonic stem cell lines are genetically identical to the cell from which the DNA was originally removed. As asserted by the Australian Stem Cell Centre—

Researchers regard nuclear transfer as an effective method for deriving human embryonic stem cells with specific characteristics, about which a great deal remains unknown.

SCNT represents an opportunity to better understand and develop treatments for complex diseases. Any legitimate apprehensions we may harbour about this technique can and should be addressed through legislation and regulation. Some of the aspirational research of SCNT technology both here and overseas includes producing pancreatic islet cells for diabetes, dopaminergic neurons for Parkinson's disease, cardiomyocytes for heart disease and neurones for spinal cord injuries to name just a few.

There is little doubt in my mind that allowing some of the abovementioned research practices will significantly benefit medical and scientific research in Queensland. In its own embryonic stages, stem cell research, both embryonic and adult, has shown considerable potential in finding answers to treating a wide range of health conditions from the treatment of physical trauma to the prevention of degenerative conditions and genetic diseases. For many Queenslanders who suffer a condition, and for the many

hundreds of thousands more whose lives have been touched by someone who is suffering, stem cell research tends to offer hope where traditionally there was none under current medical practices.

Across Australia and internationally, scientists, doctors and gene therapists are investigating stem cells for their potential in the treatment and prevention of a huge range of medical conditions. The San Raffaele Telethon Institute for Gene Therapy in Milan is using adult and embryonic stem cells to learn more about the nature and development of human diseases, including immunodeficiencies, lysosomal storage disorders, diabetes, cystic fibrosis and muscle dystrophies. Through studies involving human embryonic research, scientists have also been able to learn more about degenerative conditions such as Parkinson's disease and Alzheimer's.

Much success and potential has been demonstrated from research involving stem cells both here and around the world. In a few short years we now know more about disease and treatment than we ever have. In 2007, to use a recent example, we are treating thousands of young women against cervical cancer with the Gardasil vaccine. If this bill is passed, in 2017 who knows what we will have achieved. The difficulty for me is not knowing where we are going and what this kind of genetic research will uncover. We do not know where this will lead. However, stem cells, particularly human embryonic stem cells, have shown great potential to drive the future of molecular medicine in Australia and around the world.

Professor Ian Frazer, our renowned Queensland Australian of the Year and the creator of one of the world's first cancer vaccines, has been a strong advocate for stem cell research. In a letter to our federal colleagues who considered these amendments to Commonwealth statutes at the end of last year, Professor Frazer highlighted the importance of our decision and the impact it will have on generations to come. He said—

The decision you make will determine the ability of Australia's medical researchers to participate in this exciting new field, and in the longer term has the potential to impact on the quality of medical treatment our children receive. Will our children look back in 25 years and say 'our parliamentarians made the right decision that gave us access to cures for diabetes, heart disease and neurological disorders'?

This decision may well be our lasting political legacy. Much has been said over recent weeks about alternatives to embryonic stem cells. As I have mentioned, much success and potential has been demonstrated from research using adult stem cells. Bone marrow used in the treatment of cancer is derived from adult stem cells. There has also been much excitement surrounding the potential for adult stem cells drawn from umbilical cord blood. Research utilising adult stem cells has produced promising outcomes in the treatment of cancers, cardiovascular and autoimmune diseases and neural degenerative diseases just to name a few.

However, while valuable research continues into the viability of adult stem cell research, many scientists say embryonic stem cell research is imperative and represents far greater promise in the development of medical treatments for a wide range of conditions from potentially fixing spinal cord and heart damage to reversing brain damage. As human embryonic stem cells have the potential to be differentiated into basically all of the body cell types, they are considered more useful for the nervous system therapies contrasted with adult stem cells which are more specialised and restricted than embryonic stem cells.

As I briefly mentioned, human embryonic stem cells are derived from human embryos or the entity, a precursor to a human embryo, that are four to seven days old. At this stage, the two pronuclei, fused together in the fertilisation process, have developed into a mass of cells collectively known as the blastocyst. This mass of between 200 and 250 cells contains around 30 cells which make up the inner cell mass which are pluripotent stem cells that have the potential to develop into any one of the 200-odd cell types found in the adult organism.

Opponents of embryonic stem cell research argue that this entity represents a human life in its preliminary stages and given the opportunity it would develop into a baby. I think it is important to note that the legislation before the House does not allow human embryos to be specifically created for research purposes. My colleagues and I had difficulty with this point as this was not sufficiently clear in the bill's provisions and explanatory notes. The passage on restricted research practices seemingly contradicted another on those practices which remain strictly prohibited by law.

The bill will allow research to be carried out on human embryos created by means other than by fertilisation of a human egg by human sperm not beyond 14 days. This provision covers practices such as SCNT, somatic cell nuclear transfer, and parthenogenesis, which represent artificial means by which scientists can create embryos. The difficulty I have with the argument that such an entity constitutes human life is that the human embryo is created by a calculated, measured, scientific process rather than a natural biological occurrence. I am not sure an artificially created entity at this earliest stage can be said to be human life. Certainly it has the potential for human life but I do not believe an artificially created embryo at this earliest stage has the same status as something biologically conceived.

I have to be careful here given the increased prevalence of IVF treatment in society. I am certainly not suggesting that our children who were created carefully and skilfully in Petri dishes are less human than naturally conceived babies. That is not what I am suggesting. What I do believe, however, is that

there should be some distinction between embryos created for reproductive purposes and embryos created purely for scientific research.

Currently scientists are able to utilise superfluous ART embryos for research purposes where the donors consent. These surplus embryos would ordinarily be destroyed or stored for long periods of time beyond their viable storage life. In Australia there are in excess of 70,000 ART embryos which will never be used in reproductive treatment which are destined to be destroyed. My question to those who suggest the artificial creation and destruction of embryos within the first 14-day period of creation for scientific research is unethical because it discards human life is: what about the tens of thousands of embryos which go to waste every year through reproductive treatment? Again the answer gravitates back towards the definition of the point at which an entity becomes an embryo.

Egg fertilisation is not the beginning of an individual life. Scientists have argued this point on the basis that up until day 14 a single blastocyst may generate twins or triplets and so on. It is not until the end of the second week that a smaller group of cells are identified as being the precursor of the embryo proper which is when the primitive streak becomes discernible. Of all the potential lines to be drawn in the sand this is the most logical and defensible.

The characteristics of human beings that set us apart from other species is our capacity to think. Human beings are considered an advanced species based on our brain activity. This power of the human mind is now recognised at law. Doctors can now ascertain life based on a person's level of brain activity. Brain dead constitutes part of the legal definition of death and exists where a person displays no electrical activity in the brain.

If we are to accept this premise, why then should not the same criteria apply to the beginning of life? That is, if death is determined by the cessation of brain activity should birth then not be determined by the commencement of brain activity. This is said to occur within the first one to two months of conception—around the same time a heartbeat can be heard for the first time. If the bill mandates human embryos may only gestate outside a woman's reproductive tract for up to 14 days, scientists and medical researchers will be well within the confines to conduct these kinds of activities.

Professor John Burn, the medical director and head of the Institute of Human Genetics, argues that the entity that exists before the embryo cannot constitute individual human life because it does not present any of the vital signs of life. I hope I am not misrepresenting him in any way here, but Professor Burn refuted the religious and moral argument that human life is created at the moment of conception because historically the Catholic church did not recognise an embryo as human life until ensoulment occurred sometime later in pregnancy than conception. Professor Burn writes—

It is worthy of note that the Catholic Church adopted its present position on a precautionary principle in 1879, and prior to that they shared the opinion of other major religions that ensoulment occurred sometime later in pregnancy than conception.

Looking at it from a pragmatic perspective, there are many arguments that support the use of excess ART and artificially created human embryos, some of which I have already outlined. The efficiency argument for the use of embryos in research derives from the tens of thousands of ART embryos destined to be destroyed after treatment. If an embryo is going to be destroyed anyway, is it not far more efficient and desirable to make practical use of it than to discard it on principle?

The Council of Australian Governments meeting which agreed upon the need to further develop and regulate stem cell research in Australia agreed that research involving the use of excess ART embryos that would otherwise have been destroyed was a difficult area of public policy, involving complex and sensitive ethical and scientific issues. In 2002 the council agreed that research should be allowed on existing excess ART embryos which would have otherwise been destroyed within a strict regulatory regime. The principal legislation, as well as the amendments before the House, reinforce that view.

Furthermore, as Dr Michael Rudnicki, a senior scientist and director of molecular medicine at the Ottawa Health Research Institute suggests—

The proposed changes would provide a robust legislative framework of exceptional international standard, which would enable Australian researchers to maintain a high level of research excellence and facilitate their continued participation in the international research community in working towards treatments for a vast range of debilitating diseases.

With respect to the value of human life, advocates of embryonic stem cell research argue that the potential for life of an embryo is not mutually exclusively from the life of a child or adult. Whilst valuable in its own right, it cannot be said that the potential for life of an embryo is worth more than or in the least on par with the lives of fully developed human beings.

This issue was at the crux of the US Supreme Court's decision in Roe v Wade. Central to the landmark decision which effectively legalised abortion in the United States was the concept of viability, in the sense that an embryo becomes viable when it is potentially able to live outside the mother's womb, albeit with artificial aid. In 1973 Justice Blackmun measured viability at 28 weeks. Today it is likely to be less given the significant advances that have been made in medicine.

The point that I am making is that up until this point of viability, a test which is still applied in the US today, an embryo merely has the potential for life. Even in the natural order of things a fertilised embryo may not make it through to conception. Whilst it is incalculable how many embryos are lost to pre-implantation wastage, the percentage has been estimated around 20 per cent. Some reports even suggest as high as 80 per cent of zygotes will fail to implant in the uterine wall. Whatever the statistic, the bottom line is that a significant number of embryos, be they naturally conceived or those concocted in a Petri dish for the purposes of achieving pregnancy, are destroyed before they are medically or legally recognised as a human life. Therefore, the same should apply for human embryos for scientific research.

The National Health and Medical Research Council mandate only minimal use of human embryos for research purposes. Thus it can be submitted that more embryos will be lost to the vicissitudes of life than through scientific and medical stem cell research. Perhaps the salient reason I will support this bill is because I truly believe that one day we will be able to treat motor neurone disease, Alzheimer's and cancer.

In Australia we are already treating cancer. My daughters will be among a whole generation of women immunised against cervical cancer. Every year half a million women worldwide die from cervical cancer. Professor Ian Frazer's Gardasil vaccine, developed right here in Queensland, will save lives. Professor Frazer is a strong proponent of stem cell research because, in his own words—

... if medical research had been suspended in the 1970s when we considered imposing a moratorium on genetic research the cervical cancer vaccine would never have been developed.

When one looks at the advancements that have already been made in the area of stem cell research, the potential medical benefits in my opinion overshadow the arguments for the contrary. Of course, there is nothing more valuable than life and I would not condone anything that erodes its sanctity. I do not believe that this legislation does this. This bill and the principal act represent moderate and just middle ground. The undeniable fact is that molecular medicine is developing at an incredibly rapid rate. Regardless of whether we accept stem cell research, specifically embryonic stem cell research, in Australia, the fact is it is going ahead in other countries. The UK, Netherlands, Sweden, Denmark, Finland, Belgium, Greece, Israel, Singapore, Japan and China—these countries all have supportive policies towards stem cell research. As a nation we have the opportunity to participate on the world stage and become leaders in the field. Our scientists and medicos are amongst the best in the world and I have not a shadow of a doubt that one day we could be exporting treatment for some of humankind's most insidious diseases with a green and gold 'Made in Australia' tag on it. While we are justifiably concerned at this playing-God science, fear should not hinder the future development of science.

Most people experience apprehension about the future at some time in their life. In the same way fear of uncertainty has plagued science for centuries, but importantly it has not deterred researchers from challenging custom and conviction. The 16th century sparked the scientific revolution, the foundation upon which modern science was built. Science's greatest minds—Nicolaus Copernicus, Galileo Galilei, Isaac Newton and Andreas Vesalius who performed some of the earliest medical research on anatomy—were all persecuted at some stage of their lives for their ideas and research. Some great minds of science died in their quest for the discovery of scientific truth. Progression is something which protagonists have had to fight for, in the same way that our modern prodigies of science are fighting for embryonic stem cell research.

At every major crossroad of scientific and medical discovery there has been both widespread support and vehement opposition to it. In the 1950s when cardiac surgeon Professor Christian Barnard was toying with the idea of organ transplants and open-heart surgery, his dissidents publicly decried him for playing God by trying to prolong human life through medical and scientific exploration. He went on to become one of the leading heart surgeons in the world and established the foundation for many of the practices of modern medicine. Several months ago I had the privilege of visiting the Queenslanders Donate centre at the Princess Alexandra Hospital and was amazed at the fantastic work it does in the area of organ and tissue transplants. How many lives have been saved by transplants and blood transfusions—practices which were once branded as immoral and unethical that are today commonplace in our hospitals? Embryonic stem cell research has the potential to improve the transplant practices currently used in our hospitals because organs containing the recipient's own DNA could be created to minimise the risk of organ rejection by the body's immune system.

In the seventies and eighties people were questioning the ethics involved in genetic engineering and the development of assisted reproductive treatments such as IVF. As many as one in six Australian couples have trouble conceiving a baby. Many of these couples will turn to ART to enable them to experience the joy of having children. I have friends whose children were born of IVF and these children are no less special than a child conceived naturally. Few people today would argue the ethics and morality of IVF, yet rewind back to the early 1980s and that is exactly what was happening. In fact, one dissenter moved a motion in federal parliament suggesting the legal, ethical and moral problems of IVF are so serious, far reaching and so incalculable that it should be banned in Australia. The point I am making is that this is not a new debate. The context differs but the premise stays the same.

Historically, the best way to control medical advancement is not by prohibition but regulation. In regulating medical science, we have been able to save and even create lives. Embryonic stem cell research promises to do the same. As arbiters, our job is to set the boundaries for scientific discovery whilst ensuring Queenslanders are not caged in. If we were to persecute the cream of our Smart State by shutting the door to further research in disallowing the very practices which may one day improve the human condition, we will lose these great minds to the states and institutions that will support their endeavours. Dr Barry Marshall, the 2005 Nobel Prize laureate, sees this legislation as a necessity. To borrow his words—

We can be 100 per cent certain that if the current legislation stays in place in Australia there will be no more advances in this area and everybody interested in it will go overseas.

I note that this year's joint recipients of the Nobel medicine prize just announced won the honour for their research in gene targeting using embryo stem cells in mice to replicate human disease. This research is going forward and is receiving international acclaim. Here Queensland has the opportunity to be involved in this groundbreaking science.

Since 1998 we have seen remarkable advances in medical research thanks to embryonic stem cell research, which is still very much in its own infancy. Adult stem cell research has been carried out for decades and its benefits are irrefutable. However, scientists and medical researchers are telling us about the untapped potential of embryonic stem cell research and its prospects for further developing our understanding of human disease. While adult embryos have helped in the treatment of more than 70 diseases, many scientists agree that much of the future of cellular therapy development lies in embryo stem cells. Embryo stem cells present more opportunities for researchers than adult stem cells because they self-renew at a much higher rate and have greater elasticity, thus further widening the spectrum of diseases which may be treated.

The research that has been carried out to date on surplus ART embryos is yielding promising results. However, scientists are very limited in their ability to delve into the minutiae of disease because only healthy cells are created for reproductive purposes. By virtue, excess ART embryos are limited in their ability to unlock the secrets of sickness because the cells are not so affected. Creating flawed cells by means such as SCNT will enable researchers to dissect disease which is where the real benefit of embryonic stem cell research lies. Thus in order for scientists to realise the potential of embryonic stem cell research, they need to be able to create an embryo by means other than the fertilisation of a human egg by human sperm to carry out research. This bill sets out the necessary parameters for such activity and to my mind strikes a balance between our moral and ethical obligations to protect the sanctity of life with our desire to help the sick and the vulnerable by improving their chances of remission.

We know many health benefits have been born of adult stem cell research. Whilst we do not know what might be achieved through embryonic stem cell research, we should not reject it simply because we are collectively afraid of the unknown. Both adult and embryonic stem cell research should be explored in order to maximise our intelligence on some of the most complex human conditions. This bill is imperative if we are to advance the latter. In a similar vein, this bill is imperative in order to ensure that any research involving embryonic life is carried out ethically and in compliance with the strict legislative safeguards which protect against the misuse of this research privilege. The amendments before the House do not make human embryonic stem cell research easy. Yes, the bill makes some embryonic stem cell research lawful, but it certainly will not open a floodgate. The bill sets down very strict conditions for research and requires all research to be licensed by the National Health and Medical Research Council.

As I noted earlier, since the principal legislation was introduced in 2002 only nine licences have ever been issued permitting research involving human embryos. Scientists face an arduous application process under the NHMRC to carry out this unique and sensitive research. If, and only if, they satisfy a raft of conditions will the council and its subsidiary Human Research Ethics Committee issue a provisional licence to enable the use of human embryos. The fact that no new licences have been granted in more than two years is testament to the fact that Australia's policy on human cloning and embryonic stem cell research does not cultivate a landmine of legal and ethical issues. It is for this reason also that I do not accept the slippery slide argument against progressing embryonic stem cell research. I do not believe that allowing this small concession will spark a downward spiral towards reproductive cloning. It is quite clear that this form of cloning is grossly unacceptable and abhorred in Queensland, Australia and internationally. It would require a colossal attitudinal shift for such practices to be accepted in Australia, which I believe is completely unrealistic and unattainable. The community's repugnance of human cloning will ensure that it is never decriminalised in Queensland.

As I said, this bill and its principal legislation set the necessary boundaries. They codify the practices that we, as representatives of four million Queenslanders, believe should be sanctioned and those which should continue to be unlawful. We need a policy framework that will advance this type of research within limits.

Today's editorial in the *Courier-Mail* puts forward an excellent point—

... Were research involving therapeutic cloning interstate or overseas to produce a medical breakthrough, would you also oppose the adoption of potentially life-saving treatment because of ethical concerns about the research that preceded it?

Faced with a life-or-death situation, I submit there would be few people who would turn down life-saving treatment for them or their families because of ethical concerns. As I outlined earlier, the same ethical arguments shrouded organ transplants, blood transfusions and IVF when these procedures were in their spawning stages. However, I recognise that some people opt against such treatment. The same should apply to treatments born of embryonic stem cell research.

In closing, I would like to reflect on some of the correspondence that I have received in the time that I have been researching and contemplating this bill. Both the advocates and the antagonists of human embryo research have provided an insight into the debate, for which I am thankful. However, I took exception to some of the comments that I received by those who were totally opposed to this bill. The fervour of some of the arguments against it tended to undermine those people's position. In much of the argument the implication was that those in favour of this kind of research under strict restraints are somehow less than ethical, or even immoral. I do not think it is appropriate to be casting judgements such as, 'We don't see things as they are; we see things as "we" are.' Each and every one of us is entitled to our opinion based on our own personal experience, research, hopes and beliefs. While I, too, share some apprehensions about this kind of research, I believe that humanity has a higher duty to alleviate human suffering. For me, there is no distinguishable moral high ground.

Parkinson's disease, Alzheimer's, multiple sclerosis, motor neurone disease and cancer: these conditions affect many lives. They have affected my own life and those of my family members as well. I had an uncle—my father's brother in Holland—and I remember clearly as a child growing up that we would visit him. He had multiple sclerosis. As a child you are not very aware of what these diseases are. I now remember that he went through a slow, progressive disease that started with him being on sticks, then in a walking frame, then in a wheelchair and finally he was confined to bed and died far younger than he should have. I remember his family trying all sorts of alternative treatments—buckwheat therapies and dietary therapies. The type of therapy referred to in this bill that we are debating may give hope to people who suffer from multiple sclerosis. That is one case.

As the member for Mudgeeraba is very aware, I have a brother-in-law who is about four kilometres away from here at Toowong and who has motor neurone disease. He is about 54 years old and it has destroyed his family. My brother-in-law has had this terrible condition since the year 2000. He now weighs 35 kilos and is completely bedridden requiring 24-hour nursing and he has two daughters of a similar age to mine. It is just a terrible disease. This research gives some sort of hope to people who suffer from disorders like motor neurone disease—maybe not for the people who are suffering now but for the people who may suffer in the future. That is why we do not just say that charities are raising money; hopefully they will provide some sort of treatment for these conditions in the future. We are raising money for all the people who suffer these conditions when we go and support them as members of parliament so that hopefully we can get some sort of cure for these conditions. That is what this legislation is about.

Living with these conditions, which not only kills the body but also a person's spirit, is incredibly difficult. Knowing that the cures may be out there but remain undiscovered is excruciating. Their doctors remain hopeful, and so do I. That is why, despite some ethical apprehensions that I harbour about this legislation, I will support this bill.