**Speaking about crazy science**

**"Designer babies"**

**Acting – make your own scene, as a sequel or prequel to the following.**

***Participants: The host, the bioengineer, the ethics committee member***

**The host:** Today's debate will tackle a very hot issue, designer babies. A designer baby is a baby whose genetic makeup has been selected or altered, often to include a particular gene or to remove genes associated with a disease. Let's welcome Mr Lean, a bioengineer, and Mr Smart, a member of an ethics committee. Mr Lean, is my definition exact? What do you think of designer babies?

**The bioengineer:** Thanks to medical breakthroughs, we have more opportunities. It is easier to decide what a future child will look like. We can now resort to PGD, pre-implantation genetic diagnosis, to choose desired characteristics and prevent genetic diseases. These "designer babies" are babies whose genetic makeup has been artificially selected in-vitro to ensure the presence or absence of particular genes.

**The host:** Alright, but what are the benefits of PGD concretely?

**The bioengineer:** Parents are now able to choose the eye colour, athletic ability, beauty, intelligence and height of their offspring.

**The host:** Ok. Mr Smart, do you consider designer babies as a form of progress?

The ethics committee member: Genetic engineering presents too many unknowns. The technology used is not 100% safe yet. It is only in the experimental stages at this point. The risks of malformation and shortening the baby's lifespan cannot be ignored.

**The bioengineer:** There are always risks. But the benefits outweigh the dangers. We can, for example, stop a propensity toward obesity, mental and physical illnesses. Thanks to medical progress, parents transmit fewer genetic diseases such as Alzheimer's, Huntington's disease, Down syndrome or Spinal Muscular Atrophy.

The ethics committee member: There is no compelling medical argument for heritable genome editing. Sadly, parents may use this technology for superficial purposes, as purposely seeking out a blonde-haired, blue-eved baby for appearance concerns only.

**The host:** So, you are totally favourable to a ban on designer babies, is that right?

The ethics committee member: If we allow designer babies, most people will seek out good-looking, intelligent babies with other optimum characteristics and then, we will be faced with less variation in the gene pool as there will be more identical people. This could create a gap in society between designer and non-designer babies.

**The host:** What do you think about a total ban, Mr Lean?

**The bioengineer:** For us scientists, a ban on designer babies would be ridiculous as it would prevent us from conducting the necessary studies to get a better understanding of genetics for biolo-gists. We really need a public debate.

**The host:** Well, thank you for your participation in this controversial debate.

**Vocabulary**

* Designer baby: bébé sur mesure
* To resort to: recourir à
* To prevent (to prevent Sb FROM Ving smthg): empêcher
* Makeup: composition
* To ensure: s'assurer
* Height: taille, hauteur
* Offspring: enfants
* Unknowns: aléas
* Stages: étapes
* To shorten: écourter
* Propensity: tendance
* Down syndrome: Trisomie 21
* Compelling: convaincant
* Editing: correction
* Purposes: buts
* Purposely: délibérément
* Good-looking: beau
* Gap: fossé

**"Cloning humans should be legal"**

**FACTS AND FIGURES**

* Reproductive cloning: making a full living copy of an organism; therapeutic cloning: nuclear transplantation of a patient's own cells to generate a whole organ or tissue.
* A human clone would only be genetically the same as the human it was cloned from. Because the clone would be raised in a different environment and develop in a different period of history, it would become a unique individual.
* In 1997, Dolly the sheep became the first mammal to be successfully cloned. It required 277 trials that produced only 29 embryos, among which only one birth survived. Dolly was euthanised on 14 Feb. 2003 as she had developed a form of lung cancer. Even if many species have been cloned successfully, most human embryos fail to develop, and many pregnancies end in miscarriage.
* Nuclear transfer: scientists take an egg cell from an adult host animal and remove the cell's nucleus. They then replace the egg cell nucleus with a cell nucleus from a different adult animal. A small electrical charge is used to get the foreign nucleus to join with the egg cell. The egg cell with the transferred nucleus is put into the host animal's reproductive track. The cell can now develop into an exact genetic replica of the donor.

**VOCABULARY**: **cloning**

* Assisted reproduction
* Bone marrow : moelle épinière
* Defect =abnormality: malformation
* Disformation: déformation
* DNA: ADN
* Donor : donneur
* Duplicate: double, copie
* Embryo: embryon
* Ethical: éthique
* Genetic engineering : génie génétique
* Inherited trait : caractéristique héritée
* Misuse : abus
* Nucleus: novau
* Offspring: descendants
* Oocyte = egg cell: ovule
* PGD: preimplantation genetic diagnosis (procedure used prior to implantation to help identify genetic defects within embryos created through in vitro fertilisation to prevent certain diseases or disorders from being passed on to the child)
* Pregnancy : grossesse
* Replica: réplique, copie
* Self-esteem : amour-propre
* Sentient being : être sensible
* Stem cell: cellule souche
* Surrogate mother : mère porteuse
* To fertilise : féconder
* To implant = insert
* To tamper with nature : jouer avec la nature

**Tips for referees**

**PROS**

* Replace close dead people or prevent extinction of some ethnic groups.
* Enjoy life more serenely; no stress of disappearing; reduce anxiety.
* Useful cloning of geniuses.
* Create safer, healthier babies, immune to diseases. Remove defective genes.
* Aid in faster recovery from traumatic injuries; cure infertility.
* Do therapeutic experiments, extend lifespan or test new medicine. Source for blood, organ, and bone marrow transplants (not rejected by host body)

**CONS**

* Create monsters; reproduce harmful people (dictators). Create human "guinea pigs" for scientific experiments, slaves.
* Premature aging and malformation.
* Reduce the value of life (replaceable people). No sense of uniqueness.
* Overpopulation; pressure on natural resources, economy, security and space.
* Interfere with nature; against religious ethics. Only God has created life and its various forms in nature.
* Create a two-tier, unequal society: rich and perfect clone versus poor and sick.

**Questions**

1. What ethical problems does cloning create?
2. What kind of society can emerge?
3. What is the purpose of cloning humans?
4. Who may be cloned?
5. Can cloning promote human well-being and happiness?

**Possible answers**

1. The technology could be used for inhumane purposes. Ethically, it is wrong for any human to have control over the genetic make-up of any other individual. It creates a new human, yet strips him off his individuality.
2. It could create a society with rich people who can be cloned and choose the "perfect" traits of their offspring and poor people who will be sick and unable to get cured. It may also lead to identity crises for cloned people deprived of a unique identity and to a lack of genetic diversity.
3. Human cloning may solve infertility problems, allow cloning geniuses to help society advance, cure diseases, develop organ transplantation and save thousands of lives.
4. People whose lives have been destroyed or have not been able to reproduce in this lifetime due to tragedy as well as wealthy people or geniuses could arrange to have their DNA continued and fund research at the same time.
5. Cloning could be a step towards immortality and reduce fears of dying and losing beloved ones. But it could also generate new tensions, conflicts and inequalities.

**Essay – Cloning humans should be legal**

When Dolly the sheep was cloned in 1997, it opened the door to hope and expectations: many people started to dream of living eternally and enjoying good health. At the same time, many others feared the prospect of multiple dictators being created in laboratories. Therefore, we may wonder if cloning humans should be legal and how it could benefit mankind.

The benefits of human cloning could be immediate, like finding treatments to diseases. It can be used to create embryonic stem cells from which new tissue could be grown. This offers patients promising prospects. For instance, if a couple finds they are carriers of harmful, possibly fatal recessive genetic illnesses, there is a one in four chance they will produce a child who will die of that condition. An alternative would be to clone one of the parents. They could reproduce a child who would be unaffected by that illness in later life. Therefore, scientists could create safer, healthier babies, immune to diseases by removing defective genes. They could also aid in faster recovery from traumatic injuries and cure infertility.

Having clones would be a more ethical and suitable alternative to using animals for the experimentation of cosmetic products or drugs. Scientists could do therapeutic experiments, extend lifespan or test new medicines. It can be a source for blood, organ and bone marrow transplants which are not rejected by the host body.

Finally, being able to clone the loved ones and prevent the extinction of some ethnic groups (or geniuses) could relieve us from the stress and anxiety of bereaving the loss of close people or animals.

However, many people react with horror at the thought of a human clone. Creating clones conjures up images of monsters, especially if it is used to clone ill-intentioned people like criminals or dictators. Scientists may create guinea pigs for scientific experiments and design a new category of people: medical slaves.

Moreover, with the lack of hindsight, clones could suffer from premature aging and malformation; they could suffer from abnormality, which would be cruel and create a two-tier, unequal society in which the wealthiest could afford to have perfect clones whereas the poorest would suffer from diseases and misery.

Interfering with nature does not raise only ethical and religious issues but economic concerns too. If people are cloned, there will be more people on earth, therefore more pressure on resources, economy, security and space.

Lastly, cloning people would reduce the value of life as we would become replaceable people. There would no longer be such a thing as a sense of uniqueness.

Cloning has always been associated with terrifying images and concepts in literature and movies. Even if scientists are getting closer to making science fiction predictions a reality, they should consider the ethic, social, economic and ecological consequences of human cloning.

**"Expanding lifespan is a threat to life"**

**FACTS AND FIGURES**

* The world's oldest man has been named as Indonesian Mbah Gotho, who was said to be 146 years old when he died (he was born in 1870).
* 71.4 years was the average life expectancy of the global population in 2015 (73.8 years for females and 69.1 years for males), ranging from 60.0 years in Africa to 76.8 years in Europe.
* Women live longer than men all around the world. The gap in life expectancy between the sexes was 4.5 years in 1990 and had remained almost the same by 2015 (4.6).
* Global average life expectancy rose by 5 years between 2000 and 2015, the fastest increase since the 1960s.
* Reverse engineering may help increase longevity by finding out why centenarians are living longer and applying their recipes to our lives.
* 52% of deaths in low-income countries are caused by communicable diseases, maternal causes, conditions arising during pregnancy and childbirth, and nutritional deficiencies (7% of deaths in high-income countries). Respiratory infections are among the leading causes of death for all income groups.
* "For everything there is a season, and a time for every matter under heaven: a time to be born, and a time to die; a time to plant, and a time to pluck up what is planted" (The Bible).

**VOCABULARY – immortality**

* Anti-aging drug : médicament anti-vieillissement
* As long as possible: le plus longtemps possible
* Breakthrough : grande invention
* Centenarian : centenaire
* Healthspan = years in which vou are free of frailty or disease
* Indefinitely: indéfiniment
* Lifespan = life expectancy : espérance de vie
* Overpopulated = overcrowded : bondé
* Supplies = resources
* Threshold : seuil
* To bereave the loss : bleurer la berte
* To devalue = depreciate dévaloriser
* To extend = expand = lengthen : allonger
* To get bored : s'ennuyer
* To go beyond : dépasser
* To heal = cure diseases: soigner des maladies
* To live forever : vivre éternellement
* To lose a relative : perdre un parent
* To mess with nature. chambouler la nature
* To put a strain on = put pressure on : mettre la pression sur
* To reinvigorate : redynamiser
* To sustain : maintenir, soutenir
* Two-tier society : société à deux vitesses
* Unavoidable : inévitable
* Unending =endless : sans fin

**Tips for referees**

**CONS**

* Overpopulation: lower resources, less space available, worse pollution, more conflicts between countries over borders.
* More violent society; gap between rich and poor (only the wealthiest can afford to extend their lives). Unequal death.
* Economic cost: need for costly research and tests. Better to improve current lives.
* Increased poverty: less work, less revenue, more people to support financially for the community.
* Less valuable and worthwhile life; feel bored if no meaningful activities.

**PROS**

* Personal interest \* public good.
* Live longer \* live better (diseases, poverty, tensions).
* Possible to do more things: travel, learn, read, discover other cultures.
* See family grow up. Share memories and knowledge of the past.
* Benefit from the latest developments and inventions (medical treatments for age-related diseases, sciences, technology)
* Reduce anxiety and fear. Take one's time.
* More transmission of information and culture from experienced, talented and knowledgeable people.
* Become really good at things because more practice and experience than normally humanly possible.

**Questions**

Would we appreciate life the same way if we could live longer or eternally?

Would everyone benefit from life expansion?

Would an immortal be able to cope with the accumulated memories?

Does living longer necessarily mean being happier?

What would be more fearful than death and disease?

**Possible answers**

Being immortal would deprive us of the fear of dying and thus of the interest of making the most of little pleasurable moments; on the other hand we would be less stressed and would have more time to do and see more things.

Given the cost of treatments, only the wealthiest might be able to afford it.

Having too many memories may imprison us in the past and make us fear the future. However, the past may help us be more resourceful and deal with a wider range of problems thanks to experience, knowledge and maturity.

To live happier, we need to be healthy and active, and maybe also surrounded by those we love, which is not possible if they cannot live as long too.

Boredom and the issues resulting from overpopulation (poverty, conflicts, lack of housing and resources, pollution... might be the worst fears left.

**Essay – Expanding lifespan is a threat to life**

What used to be a dream or a science fiction feature may one day become reality. Living eternally or at least expanding lifespan is within reach thanks to medical progress. But would it be a viable idea?

Life expectancy has kept increasing, at least for middle and upper classes. Global average life expectancy rose by 5 years between 2000 and 2015, the fastest increase since the 1960s. 71.4 years was the average life expectancy of the global population in 2015 (73.8 years for females and 69.1 years for males), ranging from 60.0 years in Africa to 76.8 years in Europe. Average life expectancy is set to increase in many countries by 2030-and will exceed 90 years in South Korea: a baby girl born in South Korea in 2030 will expect to live 90.8 years. Life expectancy at birth for South Korean men will be 84.1 years.

Reverse engineering may help increase longevity by finding out why centenarians are living longer and applying their recipes to our lives. Simpler medical improvements could help cure respiratory infections which are among the leading causes of death for all income groups.

Living longer presents obvious benefits. We can do more things like travelling, learning, reading or discovering other cultures. We could become really good at things thanks to more practice and experience than normally humanly possible. We could see the family grow up and share memories and knowledge of the past. We could benefit from the latest developments and inventions such as medical treatments for age-related diseases, sciences and technology. We could take our time and feel less stressed.

The youngest could make the most of the transmission of information and culture from experienced, talented and knowledgeable people. As a result, the level of knowledge could rise and more people could take advantage of progress.

Yet, expanding lifespan would put a strain on resources. Overpopulation reduces the amount of space and the quantity of resources for all. More wars can appear owing to conflicts between countries over borders and supplies.

Society may become more violent as well: the gap between the haves and the have-nots will widen as only the wealthiest could afford to extend their lives. People would live in two-tier societies.

Research to expand life expectancy is very costly and some people may argue that it would be more sensible to improve current lives rather than mess with nature. What is the worth of living longer if we do not live better? Finding remedies to current diseases, poverty and tensions should be a priority.

Living longer may also make life less valuable and worthwhile. People may feel bored if they do not do meaningful activities.

Finally, expanding lifespan meets personal interests rather than public good. As there are more people to sustain, there will be less work, less revenue and more people to support financially for the community. Thus, more people will live in poverty.

Living longer may symbolise a breakthrough and a goal to reach for scientists but it may backfire and cause more havoc than benefits.