Issues in Bioethics
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Module No #04
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Technological Advancements and Bioethical Concerns

Hi, will come back to this course, Issues in Bioethics. This is the Unit One of Module Four. This unit primarily deals with, some of the other challenges, which Modern Bioethics faces. And, the first two lectures will be focused on, some of the challenges particularly raised by technologies, the new technological advancements in medicine. There are innumerable new technologies, that are introduced to modern medicine. They raise a lot of ethical issues. I am particularly going to focus on two of them.

The first one is going to be on, some of the important ethical issues, raised by the stem cell research. Human Embryonic Stem Cells, to be more precise. And, the kind of ethical issues raised by, both the harvesting of these stem cells, as well as using them for research and treatment. The other one is going to be primarily dealing with Gene Therapy, which will discuss after this. So, the technological advancements in medicine have always created problems.
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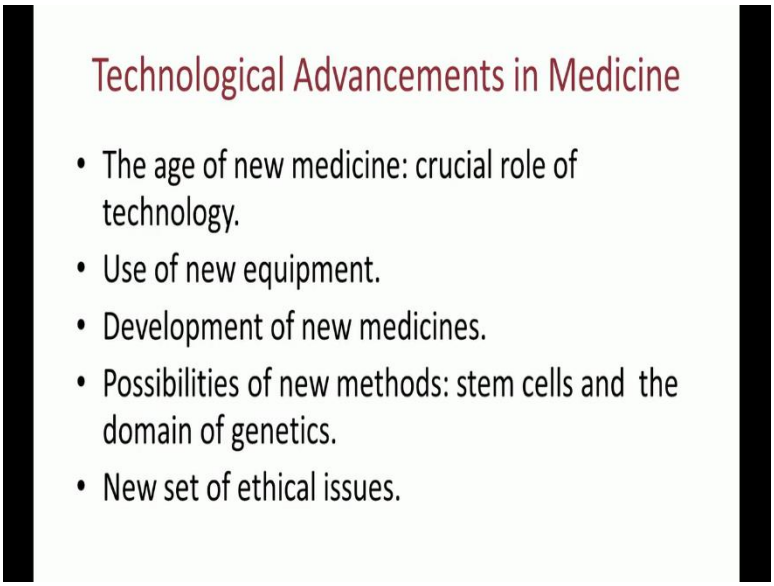

If you examine, the history of modern medicine, we can see that, whenever there is a new technology introduced, there are a host of problems, ethical issues raised by such new introductions. And, societies have to grapple with them. And, different societies have dealt with them in different ways. But of course, there used to be a clash between the existing ethical or moral, custom and codes,that a society believes in.

And, some of the existing religious codes and beliefs, were in clash with some of the situations, which these new technologies raised, with their introduction in the society. But of course, these two, particularly those issues, which stem cell research and treatment and Gene Therapy racing are quite unique. And, they are quite interesting. So, in the age of new medicine, technology plays an extremely crucial role. And, that is what, we are going to see, with these two lectures.

And, we can see that, you know, when we talk about new technologies and ethical issues raised by them. Of course, the usage of, or the introduction of new equipment in medicine, have always created some issues. But, these two are not dealing with the introduction of new equipment in medicine. And there are of course, new developments in medicine. New drugs were developed periodically by pharmaceutical firms. But, at the same time, there is an phenomenon, which happens simultaneously is that, new diseases or diseases which were unknown to us, have been surfacing and challenging humanity.

So, we are living in an age, where new technologies are constantly facing challenges from both sides. From the side of new diseases, and also from the side of ethicist, or they are raising certain ethical issues. So, the possibilities of new methods like stem cell research and stem cells treatment and the domain of genetics are raising a host of problems, which we need to address immediately in today's world. And, they of course raise is a set of new ethical issues. Because, they are offering a new set of possibilities of treatment and well-being. Now, let us concentrate on the problems surrounding the Human Embryonic Stem Cells.
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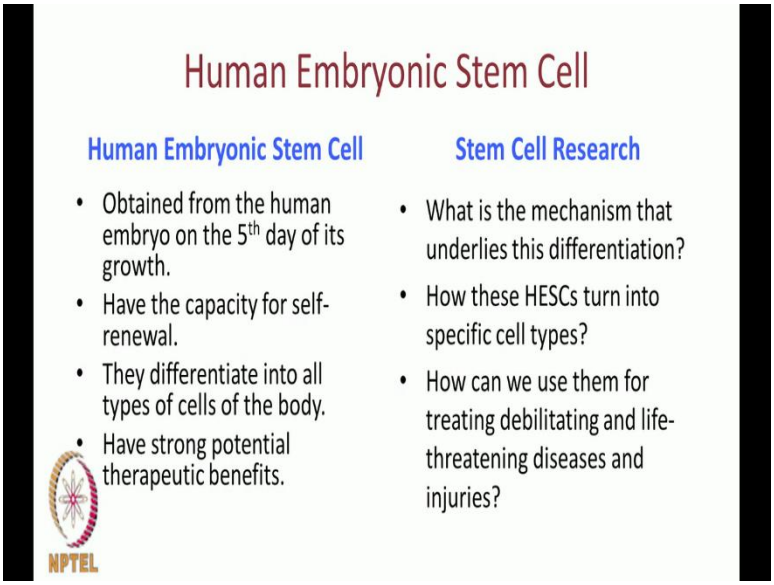

The research associated with them, manipulating them, using them, for human well-being. And also, the possibilities of treatment using them. So, what are they. What are, the Human Embryonic Stem Cell, which is a very basic elementary concept in the field of medicine. But, this may not be a very elementary concept for ethicist. They are introducing new problems. Because, they are new for ethicist. So, they are obtained from the human embryo on the 5th day, around the 5th day of its growth. They have the capacity for self-renewal.

And so, in that sense, the Human Embryonic Stem Cells are characteristically different from other cells. Because in one sense, we can say that, these cells the embryonic stem cells contain all the possibilities of all other cells, which further develops in the course of human growth. So, these are the cells, which are going to grow into different organs in the human organism, in its course of growth. And, they differentiate into all types of cells in the body. They have strong potential and therapeutic benefits. This is something, which is generated, which is encouraged, scientists and physicians to use them for therapeutic purposes. And, stem cell research aims at that. So, there are certain primary objectives of stem cell research. First of all, the question is, what is the mechanism that underlies this differentiation.

I have already mentioned that, such differentiation of cells into various organs. This primary embryonic stem cells, undifferentiated set of stem cells will gradually evolving into different

cells. So, what is that mechanism of that, differentiates them. Then again, how these cells turn into specific cell types. So, that, they become the individual organs in the human body.

So, once you know this mechanism, the mechanism of differentiation and how do they become specific individual organs, then they can be effectively used for treatment. Treatment of diseases and not only of diseases, but also disorders and disabilities. So, the promise is immense. The kind of promise, which embryonic stem cells suggest are immense in the field of medical treatment. How can we use them for treating debilitating and life-threatening diseases and injuries is a primary concern of stem cell research, everywhere in the world.

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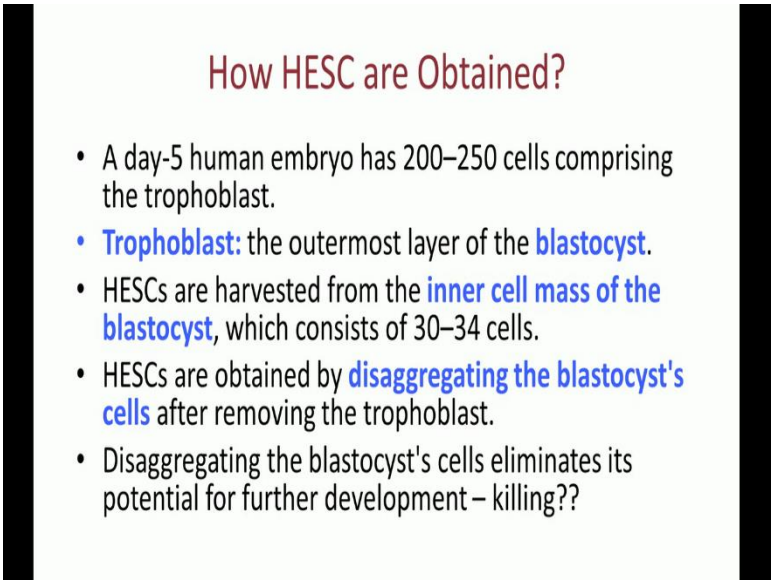

Before, we really address those issues and also the issues raised by ethicist, let us see, how they are obtained. So, if 5th day human embryo has around 200 to 250 cells comprising the trophoblast. So, each trophoblast is the outermost layer of the blastocyst. And, Human Embryonic Stem Cells are harvested from the inner cell mass of the blastocyst, which consist of 30 to 34 cells. And, Human Embryonic Stem Cells are obtained by disaggregating the blastocyst's cells after removing the trophoblast. And, this process of disaggregating the blastocysts cells eliminates its potential for further development, which can be treated as killing or which can be considered as equivalent to killing it.

So, the whole idea is that, the human embryo is a potential human being, which has life. So, in ordinary language, we can put it in this way, in order to harvest the cells, the embryonic stem cells for treatment and research and other purposes, we may have to literally kill the embryo. Because, this process of disaggregating the blastocysts cells eliminates the potential for further development, which is nothing but can be treated as killing. So, this is a problem. The crux of the problem lies here, killing the embryo.

Can we consider, killing the embryo as morally equivalent to killing a human being. And, some ethicist feel that, it is morally equivalent to killing a human being. Because, they consider that, embryos are potential human beings. And, certain other ethicist would not share this view. They would argue that; they are not yet complete human beings. Because, they have not come out the human body, they are still dependent on the mother. And again, there are several other issues, like you know you, when you talk about the human self.

Do you consider, the human self merely as a biological entity, or do you consider it also as a social entity. Then again, there are conceptions, there are issues with regard to the notion of personhood, whom do you consider as a person. Whether, you identify a human organism with a human person, to which do you accord moral status. Whether you accord moral status to the human person or to the human organism. So, all these are concerns, which we need to address and discuss.

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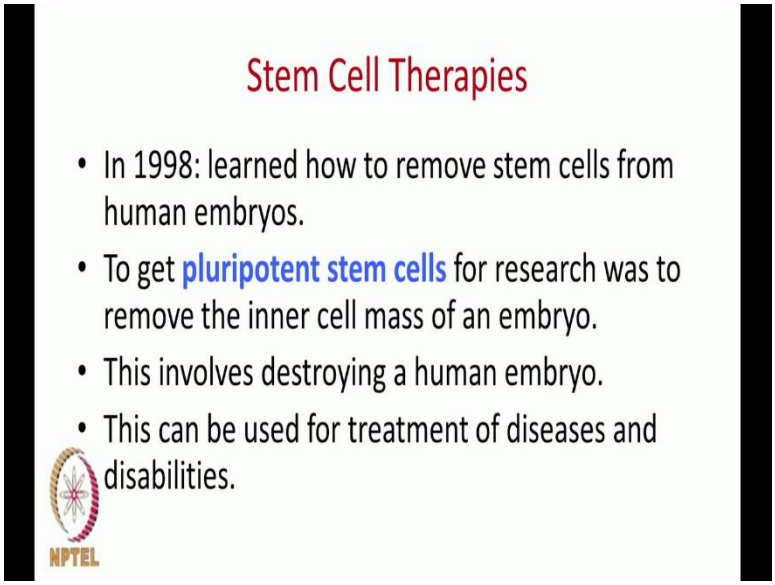

So, when you talk about the stem cell therapies, in 1998 is a landmark year, where scientist have learned, how to remove stem cells from human embryos. So, this process has initiated the possibility of using them for very important treatment. And of course, raised ethical issues. Here, we have to get pluripotent stem cells for research. And for this purpose, we have to remove it from the inner cell mass of the embryo, which involves the disaggregating or killing. We can put it in that way.

And, this involves destroying a human embryo. And, this can be used for treatment of diseases and disabilities. Of course, the promise are quite huge. Humanity will benefit a lot. But then, the interesting question is humanity might benefit out of this. But, is it morally okay, to kill the embryo, which has life in order for benefiting other human beings.

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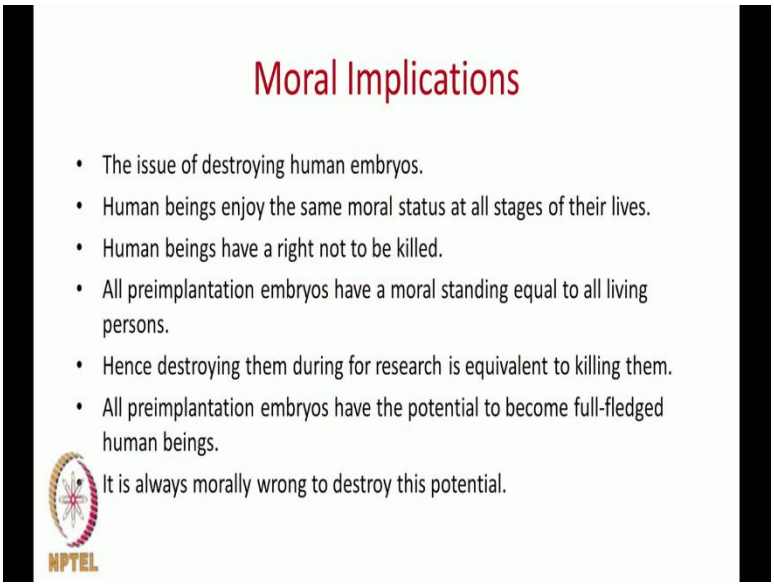

So, there are some of this very important a moral implication, the issue of destroying human embryos, which I have already mentioned. Human beings enjoy the same moral status at all stages of their lives. So, we have to consider this. Our morality or our moral sensibilities are shaped around our membership in the human community, in the community of homo sapiens. So, there are no degrees of existence, there are no degrees of membership, all of us have equal

membership in the community of humankind. Whether, regardless of the fact that, we are infants or old people, we are all members with equal status in the community of homo sapiens.

Now, the whole idea of human embryo is introducing a moral dilemma. Can we treat embryos as human beings, so that they can also be treated as members, full members of the community of homo sapiens? So, one of the strongest arguments is that, human beings enjoy the same moral status at all stages of their life, regardless of the fact that, whether you are an infant, or a young man, or a boy or a girl, or whatever stages of your life, even the embryonic stage is included in it. That can also be treated as, one of your stages of development or growth or life. So, if that is the case then, what about the moral status of embryo.

The embryos also should be enjoying equal moral status like, the grown up human beings, the adults, and everyone else in the society. (Refer Slide Time: 11:40) So, human beings have a right not to be killed. And this right, we can extend to the embryo as well. Since the embryo is also a human being in the potential sense of the term. This involves a lot of confusion, whether we can consider the embryo as a human being. What is this whole idea of potential human being? What sort of potentialities, you refer to? There are different types of potentiality. There is a passive potentiality, see for example, even an ovum or a sperm individually taken are passively potential to become human beings.

So, do we consider them as moral agents. Do we accord to them, a moral status or as individuals, as persons, as members of a homo sapiens? We do not generally do that. So, because you know, we do not consider the membership, they have or they are actively potential human beings. They are passively potential but they are not actively potential. But, the case of an embryo is slightly different. In the case of an embryo, the embryo is on the other hand an active potential. It is an active potential to be a human being. It can grow and finally develop into a human child. (Refer Slide Time: 12:54)

So, these considering this the fact that, all preimplantation embryos have a moral standing equal to all living person has to be accepted. And hence, destroying them during for research is equivalent to killing them. So, we do not have the right to destroy them, in order to harvest the

stem cells, for research and for treatment purposes. Even, if we can justify that, for the betterment of humanity. For the betterment of humanity, we cannot kill a few individuals. We cannot take away the rights of a few individuals, just because of the fact that, that is going to benefit a large humanity.

That is a kind of crude utilitarianism, which is not going to be morally appealing for humanity. (Refer Slide Time: 13:42) Again all preimplantation embryos have the potential to become full-fledged human being. So, this is what I meant by potential. When we deal with embryos, we are dealing with potential human beings. It is always morally wrong to destroy this potential. (Refer Slide Time: 13:53) Because, they can all grow as human beings. Now, if you try to understand the moral issues more directly involved in this issue, is that, does life begin at fertilization, in the womb, or at birth?

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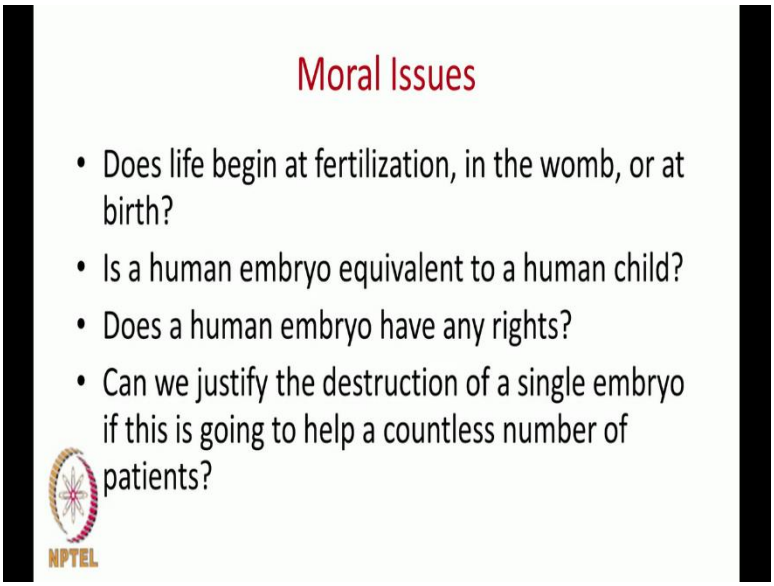

So, this is a question, a perennial issue, which different traditions, different societies, communities and moral traditions have been arguing a lot. In order to arrive at a balanced response to this problem, we need inputs from various traditions. From the scientific traditions, from religious traditions, from the conventions and customs, which a society follows. Because, there are certain communities, which have strong views about this. For example, the Catholics have very strong views about this.

And, we have seen this, when we discussed the problem of abortion, sometime earlier in this lecture series. Because they oppose, the Catholics oppose abortion at all cost. Because, abortion for them is killing, killing the embryo. But, as under certain circumstances, many countries and many societies permit abortion. Because, if it is going to the most important situation, where abortion is probably universally acceptable, is a situation, where the child is going to be a threat to the mother. Under such circumstances, to save the life of the mother, the child should be aborted.

Under certain other circumstances like, if the child is going to be born with some disabilities. Some people believe that, we should go for abortion. But, that is again a very wrong way to approach the problem. Because, that sees that, tries to approach people with disabilities, as wrong people, as people with some defects, as people who do not really deserve to be laid, which is actually not correct, morally wrong. But the question is, does life begin at fertilization, in the womb, or at birth? (Refer Slide Time: 15:56) Again, is a human embryo equivalent to a human child. So, the moral equivalents has to be clarified. Does a human embryo have any rights like a human child or an adult human being?

Because at various stages, human beings have various rights. We do not derive all our rights by virtue of being just born into the human community. Because, the rights of children are different from the rights of an adult human being. But at the same time, there are certain fundamental rights, which all human beings regardless of age and gender and other aspects, that differentiators share. So, can we ascribe similar kinds of rights, universal rights to the embryo. That is a question here. Can we justify the destruction of a single embryo? (Refer Slide Time: 16:47) If this is going to help a countless number of patients. A question, which have just raised and set, it is difficult to do this.

Because, then we would be subscribing to a crude form of utilitarianism, which is not acceptable for many communities and their moral sensibilities. Now, the question is always in this connection, it would be interesting to examine the whole issue, from the perspective of the

notion of human person. Because, there is a certain way in which, the human person is different from the human organism.

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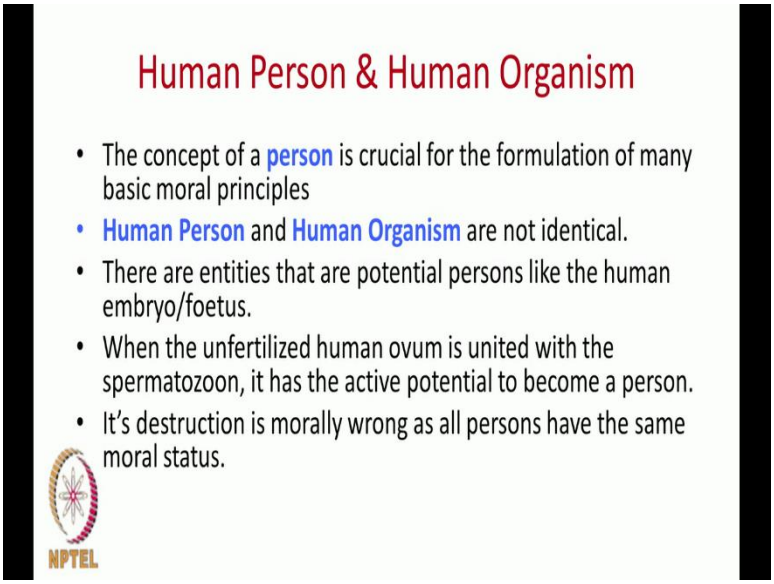

And, this distinction is very important, when we try to understand the moral status of individuals at various levels. See, as I mentioned, some of the different stages in human life, when a child is born, an infant, then a boy or a girl, then it becomes an adult, then old age. In different stages, a human being has different rights, I mentioned. And, there are certain, of course fundamental human rights. But at the same time, an infant, a child at the age of three or four is not a developed adult human being, whose rational abilities are not developed. So, we do not consider this child has a right to make complex decisions in his or her life.

So, the parents take care of them. And, the parents would take the right kind of decisions for them. So, the parents are the decision-makers for the children at that stage. Because, the child's rational abilities are not developed. Similarly, a person with the cerebral hemisphere is damaged, has an organism, he still lives in the technical sense of the term. But has lost his abilities to take decisions, rational decision-making, and memories, and many other things, which we normally attribute to a person. So, it is very important to note that, the concept of person is different from human organism. And, the concept of a person is crucial for the formulation of many basic moral principle. (Refer Slide Time: 19:03)

Our morality or rather moral status of a human being is normally associated with the concept of person. And, a human person and human organism in this sense, are not identical. There are entities, that are potential persons like the human embryo or the foetus. So, we do not consider them as full human beings. They are only potential human beings, the embryo or the foetus. Now, if they are potential human beings and not full human beings, can we attribute to them or can we say that, they also have the equal rights of a full human being. That is a question. (Refer Slide Time: 19:37)

When the unfertilized human ovum is united with the spermatozoon, it has the active potential to become a person. Only then, we attribute some sort of active potentiality, a distinction, which I made in the beginning of this lecture. Passive potentiality and the active potentiality, only when they are united. Then, it becomes an embryo, which has the active potentiality to become a person. (Refer Slide Time: 20:02) And, some ethicist believed that, its destruction is morally wrong, as all persons have the moral status. So, the whole issue is that, can we attribute personhood to an embryo. So, that we can say that, embryo has all moral rights, which a person has. This is of course a matter of huge controversy.
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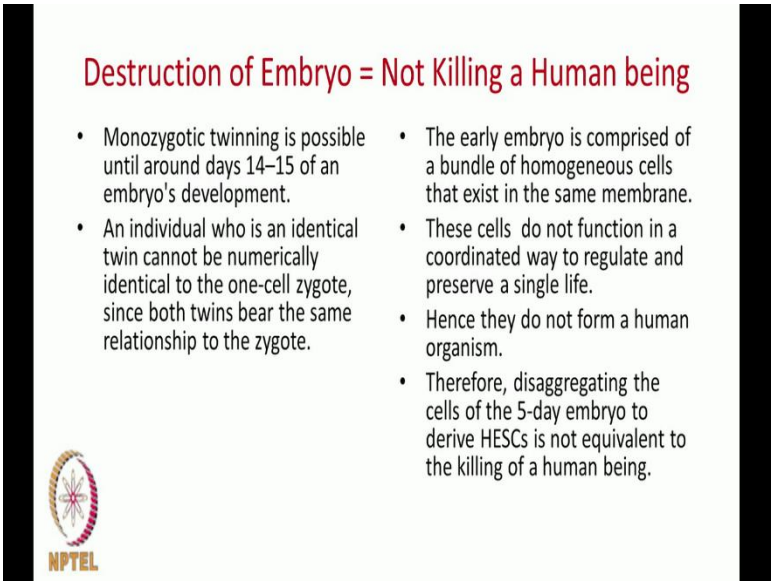

The destruction of an embryo, is it equivalent to killing a human being. And, many scientist and ethicist do not think so. They regimentally argued that, they are not one and the same. In this

case of an embryo, which is a monozygotic, the twinning is possible until around 14 to 15 days of an embryos development. So, normally as I mentioned in the beginning, the stem cells are harvested on the 5th day, around the 5th day, and till the14th of the 15th day, the monozygotic streaming is possible. So, you can have possibly two children developing out of this monozygotic stage. (Refer Slide Time: 21:14)

Now, you have two individuals developed out of it. Individual A and individual B, assume. And, there is one embryo from which, A and B have developed. So, if you attribute personhood to the embryo, then this embryo should be identical with both individual A and individual B, to which this embryo has later developed, which is logically contradictory. Because, individual A and individual B are not identical. They are two individuals. So, long as they remain as two individuals, how can we say that, the original embryo is identical with both A and B.

If the original embryo is identical with both A and B, then, we should be able to conclude that, A and B are also identical with each other, which is not the case. They might be identical twins, but, that does not mean that, they are identical. They are different individuals, with different aspirations, with different lives. Both of them might be having different life histories after certain years. And of course, there will be similarities, but still they are different. So, this raises the possibility of attributing the personhood to an embryo. If you attribute personhood to embryo, then, whose person is it, individual A's person or individual B's person. (Refer Slide Time: 22:46)

Then again, an individual, who is an identical twin, cannot be numerically identical to the one cell zygote, since both twins bear the same relationship to the zygote, which I have already explained. To try to see this argument from a different perspective. The early embryo is comprised of a bundle of homogeneous cells, that exist in the same membrane. Okay, so that is the early stage. And again, now these cells do not function in a coordinated way to regulate and preserve a single life. And hence, they do not form a human organism. There is no coordination. They do not function in a coordinated way. But, a human being, all the cells function in a coordinated way, under normal circumstances. (Refer Slide Time: 23:29)

Therefore, disaggregating the cells of the 5th day embryo to derive the Human Embryonic Stem Cells is not equivalent to the killing of the human being. So, these two are some very strong arguments against the whole identification of destruction of embryo with killing of a human being. And also, the possibility of attributing personhood to an embryo. Now, lets try to see it from another perspective, where people would argue that, destruction of embryo is killing a human being.

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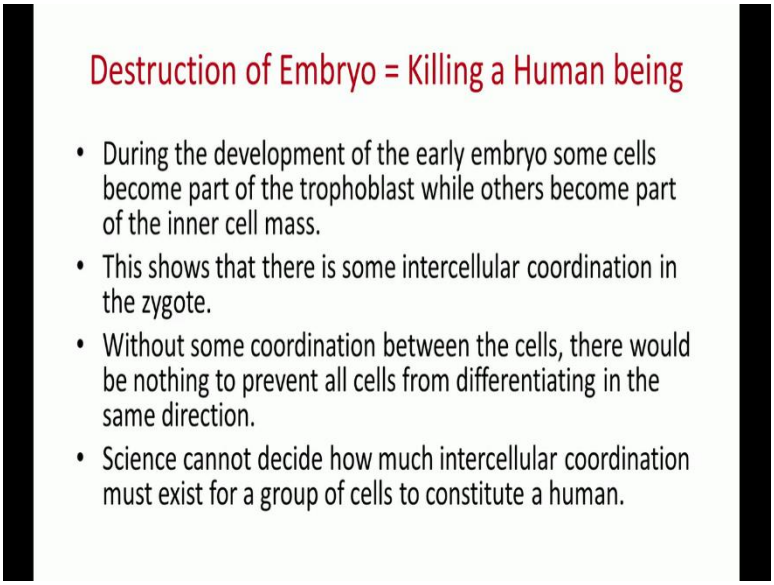

This people will argue that, during the development of the early embryo, some cells become part of the trophoblast, while others become part of the inner cell mass. This shows that, there is some intracellular coordination in the zygote. It does not happen without some coordination. So, you cannot say that, coordination is totally absent, as the proponents of the other argument claim. Without some coordination between the cells, there would be nothing to prevent all cells from differentiating in the same direction.

So, there is some sort of a design, as if there is some sort of a design cells, different cells develop into different organs. And, this will not happen without some coordination. And, that suggest the possibility of the existence of a person. Again, the interesting factor here, which we need to keep in mind is that, this is not a scientific question. So, we have been trying to understand and

appreciate the problems, that this new technology called stem cell research and treatment, have introduced in the human societies.

Of course, they offer tremendous possibilities of development and human well-being. With the new research and the new understanding of human cells, and how they function, how they manage to develop into different organs. We can target the organs, which have disabilities or disorders and try to repair them, with the help of the new knowledge available, and the technology available. And in this process, of course the ethical issues raised by such concerns cannot be brushed aside completely. We need to have a proper understanding of them and take wise decisions, take unanimous decisions, probably.

So, it is very difficult today. Because, in an ancient world, when in societies, where religious traditions are still stronger. Their moral sensibilities are more or less controlled by or decided and determined by these religious traditions. So, the religious traditions have very strong views about morality. And, we can take decisions on the basis of that, because more or less, everyone shares the same common moral assumptions. But today, we are living in a democratic world, where we have to account for or we have to respect everyone's views, not just one religious tradition. Just because one religious traditions feels that, this is the right moral approach, everyone need not subscribe to that. There are different approaches.

So, governments and policymakers will and of course the medical community should have to be sensitive to all these views. And, try to adopt a balanced view, which is not neither biased towards this side nor more prejudiced towards that side. So, we have to come up with a balanced view. And unfortunately, what happens is that, though the inputs of the science is very important here. Science cannot decide many things. (Refer Slide Time: 27:13) See, science cannot decide, how much intercellular coordination must exist for a group of cells to constitute a human. It can only tell you that, probably at this point of time, there is a coordination, it exhibits a coordination. And from this point of time, the cells would start disaggregating.

The cells at this particular point of time, the different cells will start disaggregating and developing into different organs. And, this a mechanism based on which, they develop. And all

these information, we can probably gain by the advancement in science. But, at what point of time and what level of disaggregation is required or coordination is required among cells. So, that we can identify personhood, with that combination of cells is a very difficult question. That is not a scientific question often. Because, science can give you various views about it. But, quite often the notion of personhood is highly complex, which science can alone not resolve.

So, we may have to take the insights of different traditions, different views, and of course, some secular views also. Because, we have to consider, the secular view is very important in today's world, because, we have to also consider the important contributions, the new age medicine can give us, to make our lives better in this world. So, we cannot actually avoid taking the benefits of the new technologies. But at the same time, we have to be extremely careful, when we deal with new technologies. Because, they raise certain very strong ethical concerns and we cannot be totally ethically indifferent.

So, I will wind up my discussion on stem cells research and the kind of issues, ethical issues it raises here. We have seen that; the primary issue is surrounding the concept of personhood. And the question, whether we can treat the embryo as a person. Of course, there are certain other issues as well, like when stem cell research is involved. Scientist will be definitely destroying some of the embryos and in order to isolate and harvest stem cells. And, it will definitely involve killing, according to some group of people at least. But, the larger consensus among the scientist and the society in large is that, we should continue with such research, such studies and explorations.

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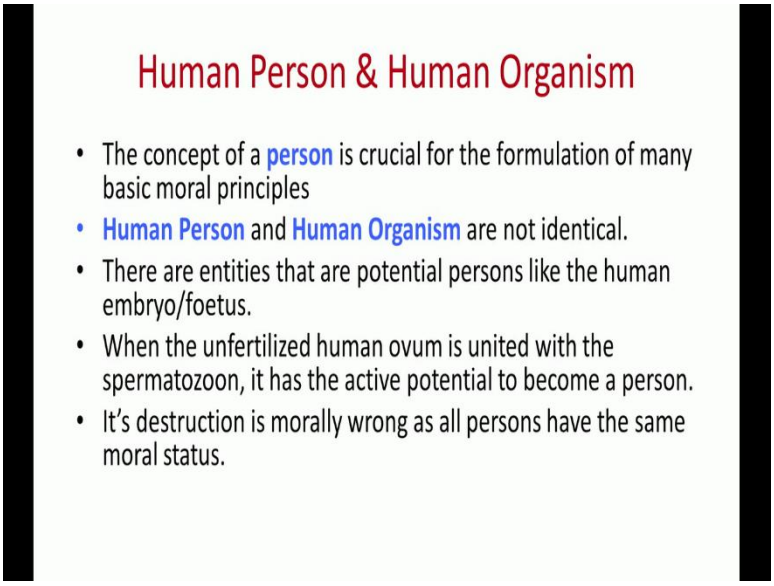

Because, the potential benefit for humanity is so large and we cannot ignore them on the basis of different views of opinion on ethics. This is not to see that, or not to say that, ethics is not important. But, at the same time, trying to see it from a broader perspective. In the next lecture, we will see another very important technological advancement, surrounding the idea of Gene Therapy and Genetics. We will wind up this lecture here. Thank you.