OPINION OF ADVOCATE GENERAL
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delivered on 10 March 2011

Case C-34/10

Oliver Brüstle
v
Greenpeace eV

(Reference for a preliminary ruling from the Bundesgerichtshof (Germany))

(Directive 98/44/EC – Legal protection of biotechnological inventions – Obtaining precursor cells from human embryonic stem cells – Patentability – Exclusion of 'uses of human embryos for industrial or commercial purposes' – Concepts of 'human embryo' and 'use for industrial or commercial purposes' – Respect for the principle of human dignity)

1. In the present case, it is necessary, for the first time, for the Court to consider the concept of 'uses of human embryos for industrial or commercial purposes' within the meaning of Article 6(2)(c) of Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions.

2. Directive 98/44 seeks to establish a Community legal framework for inventions which relate to living matter, inter alia by indicating what is patentable and what is not.

3. Thus, Article 6(1) of that directive provides that inventions must be considered unpatentable where their commercial exploitation would be contrary to *ordre public* or morality. Article 6(2)(c) of the directive cites the use of human embryos for industrial or commercial purposes as an example of inventions which are considered unpatentable.

4. In specifically asking the Court about the meaning and the scope of that exclusion from patentability, the Bundesgerichtshof (Federal Court of Justice, Germany) is in reality raising the fundamental question of the definition of the human embryo, even though that definition must be given only for the purposes of Directive 98/44, that is to say for the needs of the protection of biotechnological inventions.

5. The inventions whose patentability is being contested before the referring court relate to the use of pluripotent stem cells of human origin which are removed at a certain stage in the development of the result of the fertilisation of an ovum by a sperm. The specific question raised, however it is worded, is whether that result, which is commonly known as an 'embryo', must be legally categorised as such, with all the ensuing consequences, from the moment of conception or at a subsequent stage which is to be identified.

6. The solution adopted will determine the answers to the different questions asked, in particular the question whether pluripotent stem cells must themselves be categorised as 'embryos'.

7. In this Opinion I will explain the reasons why I consider that the concept of a human embryo must be the subject of a common understanding in all the Member States of the European Union. I will then argue that Article 6(2)(c) of Directive 98/44 must be interpreted to the effect that the concept of a human embryo applies from the fertilisation stage to the initial totipotent cells and to the entire ensuing process of the development and formation of the human body. That includes the blastocyst. I will also argue that unfertilised ova into which a cell nucleus from a mature human cell has been transplanted (3) or whose division and further development have been stimulated by parthenogenesis are also included in the concept of a human embryo in so far as the use of such techniques would result in totipotent cells being obtained. On the other hand, I will show that pluripotent embryonic stem cells are not included in that concept because they do not in themselves have the capacity to develop into a human being.

8. I will, however, propose that the Court rule that an invention must be excluded from patentability in accordance with Article 6(2)(c) of Directive 98/44 where the application of the technical process for which the patent is filed necessitates the prior destruction of human embryos or their use as base material, even if the description of that process does not contain any reference to the use of human embryos.

9. Lastly, I will explain why, in my view, the exception to the non-patentability of uses of human embryos for industrial or commercial purposes concerns only inventions for therapeutic or diagnostic purposes which are applied to the human embryo and are useful to it.

I – Legislative framework

A – *International law*

1. The TRIPS Agreement

10. The Agreement on Trade-Related Aspects of Intellectual Property Rights, which constitutes Annex 1 C of the Agreement establishing the World Trade Organisation (WTO), signed in Marrakech on 15 April 1994, was approved by Council Decision 94/800/EC of 22 December 1994 concerning the conclusion on behalf of the European Community, as regards matters within its competence, of the agreements reached in the Uruguay Round multilateral negotiations (1986-1994). (4)

11. Article 27 of the TRIPS Agreement provides:

'1. Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application. Subject to paragraph 4 of Article 65, paragraph 8 of Article 70 and paragraph 3 of this Article, patents shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced.

2. Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.

…'

2. Munich Convention

12. Article 53(a) of the Convention on the Grant of European Patents, signed at Munich on 5 October 1973, (5) as amended, to which the Union is not party, but of which the Member States are signatories, reads as follows:

'European patents shall not be granted in respect of:

(a) inventions the commercial use of which would be contrary to "*ordre public*" or morality, provided that the use shall not be deemed to be so contrary merely because it is prohibited by law or regulation in some or all of the Contracting States.'

B – *Union law*

1. The Charter of Fundamental Rights of the European Union

13. Under Article 1 of the Charter of Fundamental Rights of the European Union, (6) human dignity is inviolable and must be respected and protected.

14. Article 3 of the Charter of Fundamental Rights provides:

'1. Everyone has the right to respect for his or her physical and mental integrity.

2. In the fields of medicine and biology, the following must be respected in particular:

...

(c) the prohibition on making the human body and its parts as such a source of financial gain;

...'

2. Directive 98/44

15. The aim of Directive 98/44 is not only to establish a framework for the legal protection of biotechnological inventions, in order in particular to maintain and encourage investment in the field of biotechnology, but also to remove differences in the laws and practices of the Member States. (7)

16. Under Article 1(1) of the directive, Member States must protect biotechnological inventions under national patent law, which they must, if necessary, adjust to take account of the provisions of the directive. Article 1(2) of Directive 98/44 provides that the directive is without prejudice to the obligations of the Member States pursuant to international agreements, and in particular the TRIPS Agreement and the Convention on Biological Diversity. (8)

17. In view of the special nature of the subject-matter to which patentability relates, namely living matter, the directive sets limits on what is patentable and what is not.

18. Thus, Article 3(1) of Directive 98/44 provides that inventions which are new, which involve an inventive step and which are susceptible of industrial application are patentable even if they concern a product consisting of or containing biological material or a process by means of which biological material is produced, processed or used. Similarly, Article 3(2) of that directive stipulates that biological material which is isolated from its natural environment or produced by means of a technical process may be the subject of an invention even if it previously occurred in nature.

19. On the other hand, under Article 5(1) of the directive, 'the human body, at the various stages of its formation and development, and the simple discovery of one of its elements ... cannot constitute patentable inventions'. It is accepted, however, under Article 5(2) of Directive 98/44, that an element isolated from the human body or otherwise produced by means of a technical process ... may constitute a patentable invention, even if the structure of that element is identical to that of a natural element.

20. Article 6 of the directive also lays down prohibitions on patentability. It provides:

'1. Inventions shall be considered unpatentable where their commercial exploitation would be contrary to *ordre public* or morality; however, exploitation shall not be deemed to be so contrary merely because it is prohibited by law or regulation.

2. On the basis of paragraph 1, the following, in particular, shall be considered unpatentable:

...

(c) uses of human embryos for industrial or commercial purposes;

...'

21. Recital 42 in the preamble to the directive also states that 'such exclusion does not affect inventions for therapeutic or diagnostic purposes which are applied to the human embryo and are useful to it'.

C – *National law*

22. Based on Article 6(1) and (2)(c) of Directive 98/44, Paragraph 2(1) and (2), point 3, of the Patentgesetz (Law on patents), in its version which entered into force on 28 February 2005, (9) provides that patents may not be granted for inventions whose commercial exploitation would be contrary to *ordre public* or morality and that, in particular, patents may not be granted for uses of human embryos for industrial or commercial purposes.

23. Paragraphs 1(1), point 2, and 2(1) and (2) of the Embryonenschutzgesetz (Law on the protection of embryos) (10) of 13 December 1990 defines as a criminal offence the artificial fertilisation of ova for a purpose other than inducing pregnancy in the woman from whom they originate, the sale of human embryos conceived *in vitro* or removed from a woman before the end of the nidation process in the uterus, or their transfer, acquisition or use for a purpose other than their preservation, and the *invitro* development of human embryos for a purpose other than inducing pregnancy.

24. Under Paragraph 8(1) of the ESchG, an embryo is a fertilised human ovum capable of development, from the time of karyogamy, and any cell removed from an embryo which is able to divide and develop into an individual provided that the other conditions necessary are satisfied. In accordance with the ESchG, cells capable of developing into an individual are totipotent cells, whilst stem cells which are capable of developing into any type of cell, but which cannot develop into a complete individual, are categorised as pluripotent cells.

25. Under Paragraph 4(1) of the Gesetz zur Sicherstellung des Embryonenschutzes im Zusammenhang mit Einfuhr und Verwendung menschlicher embryonaler Stammzellen (Law to ensure the protection of embryos in connection with the importation and use of human embryonic stem cells) (11) of 28 June 2002, the importation and use of pluripotent embryonic stem cells are prohibited. There are, however, exceptions to that prohibition. Thus, under Paragraphs 4(2) and 5(1) of that law, there is an exception to that prohibition if the embryonic stem cells have been obtained in accordance with the legislation in force in the State of origin, if the embryos from which they originate were produced by *in vitro* fertilisation with a view to inducing pregnancy, if they are no longer definitively used for that purpose and there is no evidence that this is for reasons connected with the embryos themselves, if no remuneration or other quantifiable benefit has been granted or promised in consideration of the transfer of the embryos and, lastly, if the stem cells are used for research work pursuing high-level research aims in order to increase scientific knowledge in basic research or medical knowledge with a view to the development of diagnostic, preventive or therapeutic procedures for human use.

II – The facts in the main proceedings

26. Mr Brüstle is the holder of a German patent, filed on 19 December 1997, which concerns isolated and purified neural (12) precursor cells, (13) processes for their production from embryonic stem cells and the use of neural precursor cells for the treatment of neural defects.

27. It is claimed in the patent specification filed by Mr Brüstle that the transplantation of brain cells into the nervous system allows the treatment of numerous neurological diseases. The first clinical applications have already been developed, in particular for patients suffering from Parkinson's disease.

28. In order to remedy such neural defects, it is necessary to transplant immature precursor cells. According to the specification, this type of cell exists only during the brain's development phase, with a few exceptions. The use of cerebral tissue from human embryos raises significant ethical questions and means that it is not possible to meet the need for the precursor cells which are required to provide publicly available cell treatment.

29. According to the specification, the embryonic stem cells offer new prospects for the production of cells for transplantation.

30. It is thus explained that embryonic stem cells are pluripotent, (14) i.e. they are able to differentiate into any type of cell or body tissue necessary for the harmonious development of the foetus's organs (blood cells, skin cells, brain cells, liver cells etc.). These cells have the advantage of maintaining this state of pluripotency for many passages and of proliferating.

31. Mr Brüstle's invention makes it possible, among other things, to resolve the technical problem of producing an almost unlimited quantity of isolated and purified precursor cells having neural or glial properties, (15) obtained from embryonic stem cells.

32. Greenpeace eV (16) brought an action for the annulment of the patent filed by Mr Brüstle in so far as certain claims under that patent concern precursor cells obtained from human embryonic stem cells. It considers that Mr Brüstle's invention is unpatentable under Article 2 of the Law on Patents, in the version in force on 28 February 2005.

33. The Bundespatentgericht (Federal Patent Court) allowed in part the application made by Greenpeace and declared the patent filed by Mr Brüstle invalid in so far the first claim relates to precursor cells obtained from human embryonic stem cells and the twelfth and sixteenth claims relate to processes for the production of precursor cells.

34. Mr Brüstle has appealed against that judgment at the referring court. That court considers that the outcome of the present proceedings depends on the interpretation of certain provisions of Directive 98/44 and has decided to stay the proceedings.

III – The questions referred for a preliminary ruling

35. The Bundesgerichtshof asks the Court the following questions:

'1. What is meant by the term "human embryos" in Article 6(2)(c) of Directive 98/44 ...?

(a) Does it include all stages of the development of human life, beginning with the fertilisation of the ovum, or must further requirements, such as the attainment of a certain stage of development, be satisfied?

(b) Are the following organisms also included:

– unfertilised human ova into which a cell nucleus from a mature human cell has been transplanted;

– unfertilised human ova whose division and further development have been stimulated by parthenogenesis?

(c) Are stem cells obtained from human embryos at the blastocyst stage also included? [(17)]

2. What is meant by the expression "uses of human embryos for industrial or commercial purposes"? Does it include any commercial exploitation within the meaning of Article 6(1) of [Directive 98/44], especially use for the purposes of scientific research?

3. Is technical teaching to be considered unpatentable pursuant to Article 6(2)(c) of the Directive even if the use of human embryos does not form part of the technical teaching claimed with the patent, but is a necessary precondition for the application of that teaching

(a) because the patent concerns a product whose production necessitates the prior destruction of human embryos,

(b) or because the patent concerns a process for which such a product is needed as base material?'

IV – My analysis

36. The three questions, which are perfectly clear and should logically be dealt with together, ask the Court about the preliminary definition of the concept of a human embryo and whether or not that concept applies to specific situations. Does that categorisation apply from fertilisation? Is it necessary to wait for a certain development? Is the blastocyst an embryo? Does the same categorisation apply to the results obtained from parthenogenesis and therapeutic cloning techniques?

37. In addition, there are two questions regarding the causes of exclusion from patentability. One concerns the concept of 'use of embryos for industrial or commercial purposes', whilst the other relates to the inference to be drawn from the fact that the realisation of the invention requires the destruction of an embryo, even if the use of human embryos does not form part of the technical teaching claimed by the patent application.

A – *Preliminary remarks*

38. I am aware of the extremely sensitive nature of the questions asked, on which only two Member States considered it appropriate to express their views at the hearing.

39. It is on the question of the definition of an embryo that the main points of different philosophies and religions and the continual questioning of science meet.

40. I do not intend to decide between beliefs or to impose them.

41. I am also aware of the importance of the economic and financial issues connected with the questions put to the Court. These were also mentioned at the hearing, when the applicant claimed that a possible refusal of patentability would be liable to jeopardise research and the retention of researchers in Europe, so as to prevent them going to the United States or Japan. I do not consider the reference to Japan to be insignificant, since the work done by Professor Yamanaka on obtaining pluripotent stem cells from mature human cells removed from an adult, a process which would not appear to raise any ethical problems, has been protected by a patent in that State. (18)

42. I do not intend to settle a debate between scientists concerning the effectiveness or the safety of one method or another. I do not even intend to enter into that debate.

43. Nor will I hide the expectations of those who are hoping for scientific progress to relieve their illnesses.

44. Patentability and research do not appear to be indissociable from one another. The Member States are obviously free to authorise research under conditions which they lay down. Furthermore, patentability, i.e. placing on the market with the ensuing conditions relating to production, must be consistent with the requirements laid down by Directive 98/44 with a view to harmonisation which integrates ethical considerations so as to prevent the economic functioning of the market giving rise to competition at the cost of sacrificing the fundamental values of the Union.

45. The question which the Court is asked is certainly a difficult one. However, it is exclusively legal in nature. The intrinsic difficulty in the question asked is accompanied by a reference, which is ever present in law but is particularly pregnant here, to the notions of *ordre public*, morality and ethics, as a result of the clarifications made by the legislature itself, for example in recital 16 in the preamble to Directive 98/44 or Article 6 of that directive, irrespective of the principles laid down in the Charter of Fundamental Rights which feed into all Union law.

46. These references expediently illustrate that the Union is not only a market to be regulated, but also has values to be expressed. Before it was even enshrined as a fundamental value in Article 2 of the EU Treaty, the principle of human dignity had been recognised by the Court as a general legal principle.

47. In my view, against this background only legal analyses based on objective scientific information can provide a solution which is likely to be accepted by all the Member States. The same concern for objectivity leads me to say that science's silences or its failure to provide proof are also objective information which can form the basis for a legal analysis.

48. Consequently, in my view, the solution which I propose or the solution adopted by the Court will apply only at the time it is established. Advances in knowledge may lead to it being modified in future.

49. I think that it also worth pointing out that the legal definition which I will propose falls within the framework of the technical directive under examination and that, in my view, legal inferences cannot also be drawn for other areas which relate to human life, but which are on an entirely different level and fall outside the scope of Union law. For that reason, I consider that the reference made at the hearing to judgments delivered by the European Court of Human Rights on the subject of abortion is, by definition, outside the scope of our subject. It is not possible to compare the question of the possible use of human embryos for industrial or commercial purposes with national laws which seek to provide solutions to individual difficult situations.

B – *The questions*

50. Before examining the definition of human embryo, it must be decided whether it is necessary to do so.

51. The observations submitted by the Governments of the Member States tend to take the view that the definition of this concept must be left solely to their discretion.

52. I do not share that opinion.

53. Like the European Commission, I think that the concept must be defined autonomously specifically for Union law. This follows from the wording and the purpose of Directive 98/44 and from the rules already developed by the Court in the initial case-law interpreting that legislation.

54. It should be pointed out, first of all, with regard to the wording of the directive that it that it is a harmonisation directive. Recital 3 in the preamble to the directive states that 'effective and harmonised protection throughout the Member States is essential in order to maintain and encourage investment in the field of biotechnology'.

55. The directive was adopted precisely because certain inventions were not patentable in certain Member States. (19) It helps to promote research and

development in the field of biotechnology by removing the legal obstacles within the single market that are brought about by differences in national legislation and case-law. (20)

56. If it were left to the Member States to define the concept of a human embryo, in view of the differences which exist in this regard, this would mean, for example, that an invention like that of Mr Brüstle could be granted a patent in some Member States, while the patentability of such an invention would be excluded in others. This would run counter to the main objective of the directive, which is to establish effective and harmonised legal protection of biotechnological inventions. (21)

57. Moreover, other arguments along these lines can also be found in the Court's case-law.

58. First of all, according to settled case-law, the need for uniform application of Union law and the principle of equality require that the terms of a provision of Union law which makes no express reference to the law of the Member States for the purpose of determining its meaning and scope must normally be given an autonomous and uniform interpretation throughout the Union. (22) Clearly, in the present case Article 6(2)(c) of the directive, which provides that uses of human embryos for industrial or commercial purposes are to be considered unpatentable, makes no express reference to the law of the Member States.

59. Secondly, specifically with regard to the directive, after the Kingdom of the Netherlands had brought an action for its annulment, in *Netherlands* v *Parliament and Council*, the Court pointed out that by requiring the Member States to protect biotechnological inventions by means of their national patent law, Directive 98/44 in fact aimed to prevent damage to the unity of the internal market which might result from the Member States' deciding unilaterally to grant or refuse such protection. (23)

60. Thirdly, as regards the scope accorded to the Member States by Article 6(2) of the directive, the Court ruled that that provision allows the Member States no discretion with regard to the unpatentability of the processes and uses which it sets out. (24) This binding aspect of one of the key provisions of the directive would also seem to call for a uniform interpretation of the concept of a human embryo within the Union. I cannot see how such a categorical prohibition, applying to all the Member States, could exist on the basis of concepts which were not common.

61. I therefore take the view that the concept of a human embryo must have a Community understanding.

62. The first question thus calls for a definition of a human embryo within the meaning of Article 6(2)(c) of Directive 98/44.

63. Does a human embryo acquire this categorisation from the fertilisation of the ovum by the sperm or must another stage of its development be attained? Similarly, are unfertilised ova into which a cell nucleus from a mature human cell has been transplanted or whose division and further development have been stimulated by parthenogenesis considered to be human embryos within the meaning of that provision?

64. Directive 98/44 gives no definition of the concept of a human embryo. Similarly, its drafting history does not give any indication of the intended substance of the concept.

65. The elements which can serve as guidance for my analysis can be found, a priori, in three different sources, namely the legislation of the Member States, the provisions of the directive and current scientific information.

66. As far as the legislation of the Member States is concerned, it must be stated that one would search in vain for evidence of a unanimous conception.

67. Even within Member States it can be seen that legislation and judicial practice differ in this regard. Two major groups can be identified, the first considering that the human embryo exists from fertilisation and the second taking the view that it is from the time when the fertilised ovum has been transplanted into the endometrium.

68. For example, in Estonia, Article 3 of the Kunstliku viljastamise ja embrüokaitse seadus (Law on artificial insemination and embryo protection) (25) provides that an embryo is the foetus in its early stage of development, from the time of fertilisation. Similarly, in Germany, as we have seen, an embryo is a fertilised human ovum capable of development, from the time of karyogamy, and any cell removed from a 'totipotent' embryo, which is able to divide and develop into an individual. (26) In the United Kingdom, Article 1(1)(b) of the Human Fertilisation and Embryology Act 1990, (27) as amended by the Human Fertilisation and Embryology Act 2008, (28) states that references to an embryo include an egg that is in the process of fertilisation or is undergoing any other process capable of resulting in an embryo.

69. In other Member States, such as the Kingdom of Spain or the Kingdom of Sweden, the human embryo is regarded as such from the time the ovum is transplanted into the uterus.

70. In Spain, for example, there is the pre-embryo, which, under Article 1(2) of Ley 14/2006 sobre técnicas de reproducción humana asistada (Law No 14/2006

on assisted reproduction techniques) (29) of 26 May 2006, is an embryo produced *in vitro* and formed by a group of cells resulting from the progressive division of the oocyte from its fertilisation until the fourteenth day. In Article 3(l) of Ley 14/2007 de Investigación Biomédica (Law No 14/2007 on biomedical research) (30) of 3 July 2007, the embryo is defined as the stage of the embryo's development commencing from the time the fertilised oocyte lies in a woman's uterus until organogenesis begins to occur and ending 56 days after fertilisation, except the days when development might have stopped.

71. By contrast, the provisions of Directive 98/44 and the other relevant international legislation provide useful indications.

72. The provisions of Directive 98/44 provide an important indication. What should be defined? The appearance of life? The amazing moment when, *in utero*, what was perhaps only a group of cells changes in nature and becomes, whilst not yet a human being, an object, or even a subject of law? Not at all. This is not the question which follows from the wording and the approach taken by the directive which, through the wise wording it uses, leads us to define not life, but the human body. It is 'the human body, at the various stages of its formation and development' for which it demands protection (31) when it declares it expressly unpatentable.

73. The body exists, is formed and develops independently of the person who occupies it.

74. In short, the question asked is what form, what stage of development of the human body, must be given the legal categorisation of 'embryo'.

75. The second factor of interpretation which strikes the reader, as I have already stated, is the importance of the reference to ethics. This can be easily explained since biotechnology affects living matter, and here in particular the human being. (32)

76. For example, Directive 98/44 stipulates that patent law must be applied so as to respect the fundamental principles safeguarding the dignity and integrity of the person. (33)

77. Similarly, the Union legislature stresses the principle whereby inventions must be excluded from patentability where their commercial exploitation offends against *ordre public* or morality and points out that those two concepts correspond in particular to ethical or moral principles recognised in a Member State, respect for which is *particularly* (34) important in the field of biotechnology. (35)

78. The relevant international agreements also provide for similar limits. Thus, Article 27(2) of the TRIPS Agreement stipulates that Members may exclude from

patentability inventions, the prevention of the commercial exploitation of which is necessary to protect *ordre public* or morality. Similarly, Article 53(a) of the Munich Convention states that inventions the commercial use of which would be contrary to *ordre public* or morality are not patentable.

79. In conjunction with the above considerations, I believe that current scientific information leads us to the desired definition, based on both what it offers in terms of specific knowledge and the inferences which can be drawn from its silences.

80. Contemporary science can provide in-depth knowledge of the biological process from conception to birth but it cannot, at present, tell us when the human person truly begins. In this ongoing process which commences with gamete fusion, is it possible to say this with the indisputable scientific precision which is the only way to avoid ethical or moral questions, because it resolves them?

81. It must be acknowledged that, at the current state of knowledge, this question can only be answered in the negative because it is impossible, at present, to detect the appearance of life, perhaps because we are unable to define it. Should it then be that we ask in what respect the precursor of life deserves less protection than that in which it will naturally result?

82. Put in this way, the question would then refer to a solution directly inspired by philosophical or religious considerations and would therefore seem impossible to formulate in a way which is acceptable to everyone.

83. This will not be my approach.

84. Science teaches us – and it is now universally accepted, at least in the Member States – that development from conception begins with a few cells, which exist in their original state for only a few days. These are totipotent cells whose main characteristic is that each of them has the capacity to develop into a complete human being. They hold within them the full capacity for subsequent division, then for specialisation, which will ultimately lead to the birth of a human being. The full capacity for subsequent development is therefore concentrated into one cell.

85. Consequently, in my view totipotent cells represent the first stage of the human body which they will become. They must therefore be legally categorised as embryos.

86. The question whether that categorisation must be recognised from before or only after nidation is irrelevant here, in my view, even though I fully appreciate its utilitarian aspect.

87. How can we justify the legal categorisation being different after this particular event? Because the future of the fertilised ovum is uncertain as long as nidation does not take place? Is it not also uncertain after that? Does all nidation result in a birth? It is clear that the answer is no. On the other hand, I cannot see why categorisation would be refused on the pretext of a possible dangerous event before nidation and would not be afterwards, when the same danger exists, but materialises less frequently. Would probability be a source of law in that case?

88. For the sake of consistency, I also do not see why legal categorisation as an embryo would be refused in the case of *in vitro* fertilisation, unless it is to enable a couple to bring children into their family.

89. Here, the distinguishing legal criterion would be psychological and would hinge on the intention preceding gamete fusion. Such a criterion cannot be universally accepted in the Member States. There would immediately be objections directly relating to ethics, with repercussions for the assessment of *ordre public* and morality, to use the expressions employed in Directive 98/44 and the abovementioned international conventions.

90. Such a solution would immediately open the way to the industrial production of embryos for embryonic stem cells. Such practices obviously require the removal of gametes, whether free of charge or not. They could no longer be prohibited by national laws, such as the German law, because, based on the definition given by the Court, they could no longer be considered to be contrary to *ordre public* by the Member State wishing to prohibit them. Directive 98/44 does state that a practice is not contrary to *ordre public* merely because it is prohibited by the Member State. The assessment with regard to *ordre public* must be made having regard to the rules laid down in the directive. What is authorised by the directive could no longer be prohibited by national law.

91. On the basis of this definition, I consider, moreover, that every totipotent cell, whatever the means by which it has been obtained, is an embryo and that any patentability must be excluded. (36) This definition therefore covers unfertilised ova into which a cell nucleus from a mature cell has been transplanted and unfertilised ova whose division has been stimulated by parthenogenesis in so far as, according to the written observations submitted to the Court, totipotent cells would be obtained in that way.

92. However, recognition that a totipotent cell is categorised as an embryo resolves only part of the problem raised.

93. As its growth is stimulated by the initial totipotent cells, at a still very early stage in its development, the embryo is formed not of totipotent cells, but of pluripotent cells, which lie at the heart of the patent filed by Mr Brüstle. These cells can develop into all kinds of cells, gradually to form all the organs of the

human body. However, the main difference is that they cannot develop separately into a complete human being. They are already the sign of diversification which, as the cells multiply, will subsequently result in specialisation and diversification, leading to the appearance of the organs and all the individual parts of the human body which will be born.

94. One of the first stages attained when the totipotent cells have given way to pluripotent cells is called the blastocyst. Does it also constitute an embryo from a legal point of view? A reminder of the development process, even if it is clumsy and partial like the one above, clearly shows that the thing to which the totipotent cells have given way is the product of their own special nature, the thing for which they exist. Whilst, in themselves, totipotent cells hold the capacity to develop a complete human body, the blastocyst is the product of this capacity for development at a certain moment. It is therefore one of the aspects of the development of the human body and constitutes one of the stages.

95. Accordingly, it must itself be categorised as an embryo, like any stage before or after that development. It would otherwise be paradoxical to refuse legal categorisation as an embryo for the blastocyst, which it is the product of the normal growth of the initial cells. This would essentially diminish the protection of the human body at a more advanced stage in its development.

96. It should also be pointed out that, in accordance with the principle of dignity and integrity of the person, Directive 98/44 prohibits the patentability of the human body, at the various stages of its formation and development, including germ cells. (37) This shows that human dignity is a principle which must be applied not only to an existing human person, to a child who has been born, but also to the human body from the first stage in its development, i.e. from fertilisation.

97. The abovementioned principles will guide the remainder of my analysis.

98. It follows that a pluripotent cell in isolation cannot therefore be regarded as constituting an embryo in itself. In this regard, I concur with the position expressed in the national legislation of a number of Member States.

99. Most of the Member States take the view that pluripotent stem cells are not human embryos. In German law, for example, this follows directly from the distinction between pluripotent cells and totipotent cells. Thus, under Paragraph 8(1) of the ESchG, the human embryo also includes any ‘totipotent’ cell removed from an embryo. In the United Kingdom, the law provides that stem cells obtained from a human embryo at the blastocyst stage are not included within the concept of a human embryo, partly because they are incapable of further development. (38) Similarly, in the Czech Republic the legislature defines the

human embryo as a cell or group of totipotent cells which are capable of developing into a human individual. (39)

100. Given that embryonic stem cells, taken in isolation, are no longer capable of developing into a complete individual, they can no longer, in my view, be categorised as human embryos. These cells have been removed at a certain stage in the development of the embryo and they are not capable, in themselves, of resuming that development.

101. In my view, embryonic stem cells must be regarded as elements isolated from the human body within the meaning of Article 5(2) of Directive 98/44. As Mr Brüstle explains in his observations to the Court, embryonic stem cells are obtained from the internal cellular mass of the blastocyst, which is then removed. (40) An element of the human body, in the course of its development, has therefore been isolated in order to proliferate the cells contained in that cellular mass.

102. Moreover, the Union legislature also seems to regard an embryonic stem cell as an element isolated from the human body, since recital 7 in the preamble to Directive 2004/23/EC, (41) which sets standards of quality and safety for tissues and cells intended for human applications, (42) states that the directive also applies to adult and embryonic stem cells.

103. Nevertheless, it is not possible to ignore the origin of this pluripotent cell. It is not a problem, in itself, that it comes from some stage in the development of the human body, provided only that its removal does not result in the destruction of that human body at the stage of its development at which the removal is carried out.

104. The pluripotent stem cell in the present case is removed from the blastocyst which, as I have previously defined, itself constitutes an embryo, that is to say one of the stages in the formation and development of the human body which the removal will destroy.

105. The argument put forward to the Court at the hearing, that the problem of patentability which hinges on the removed cell, the way in which it has been removed and the consequences of such removal do not have to be taken into account seems unacceptable, in my view, for reasons connected with *ordre public* and morality. A simple example will illustrate my remarks.

106. The current judicial activity of the International Criminal Tribunal for the former Yugoslavia shows us, obviously subject to the presumption of innocence, that in the course of those events prisoners were killed in order to remove organs for trafficking. If, rather than trafficking, there were experiments which resulted in ‘inventions’ within the meaning of the term in patent law, would they have had to

have been recognised as patentable on the ground that the way in which they were obtained was outside the scope of the technical claim in the patent?

107. Such blinkered thinking cannot result in a solution acceptable to the greatest number.

108. Consequently, even though the claims under the patent did not specify that human embryos are used for the exploitation of the invention, when they actually are, the patentability of such an invention must be excluded. If that were not the case, the prohibition under Article 6(2)(c) of Directive 98/44 would be easy to circumvent, since the person applying for a patent for his invention would only have to 'neglect' to specify in the patent claims that human embryos were used or destroyed. That provision would then be deprived entirely of its effectiveness. (43)

109. It must therefore be agreed, if only for the sake of consistency, that inventions relating to pluripotent stem cells can be patentable only if they are not obtained to the detriment of an embryo, whether its destruction or its modification.

110. These cells are removed from the human embryo at the blastocyst stage and they necessarily entail the destruction of the human embryo. To make an industrial application of an invention using embryonic stem cells would amount to using human embryos as a simple base material. Such an invention would exploit the human body in the initial stages of its development. It would seem pointless, indeed superfluous, to mention again the references already made to ethics and *ordre public*.

111. There is an exception to the prohibition of patentability. It is laid down by Directive 98/44 itself, namely where the invention has therapeutic or diagnostic purposes which are applied to the embryo and are useful to it. (44) It is clear from the drafting history of the directive that by introducing the concept of 'for industrial or commercial purposes', the Council of the European Union rightly wished to make a contrast between such uses and inventions for therapeutic or diagnostic purposes which are applied to the human embryo and are useful to it. (45)

112. Since exceptions must be interpreted strictly, they must be reserved for the specific case stated in Directive 98/44. If research can always be authorised by the Member States under the procedures laid down by national legislation, the patentability of inventions can be envisaged only in accordance with the rules introduced by the directive.

113. As regards the concept of use for industrial or commercial purposes, it seems clear that there is no likelihood of confusion between these two cases. Use for

industrial or commercial purposes requires large-scale production, which is in any case out of all proportion to, for example, the number of operations carried out or potentially carried out *in utero* on an embryo to correct a malformation and to improve chances of survival.

114. Industrial and commercial exploitation would presuppose, for example, cell cultures intended for pharmaceutical laboratories with a view to the manufacture of medicines. The more the technique allows cases to be treated, the larger the production of cells, requiring recourse to a proportional number of embryos, which would therefore be created only to be destroyed a few days later. Would a definition which essentially authorises such a practice be consistent with the concept of *ordre public*, and with an ethical conception which could be shared by all the Member States of the Union? It is clear that it would not. (46)

115. Consequently, in the light of all the foregoing, I consider that Article 6(2)(c) of Directive 98/44 must be interpreted to the effect that the concept of a human embryo applies from the fertilisation stage to the initial totipotent cells and to the entire ensuing process of the development and formation of the human body. That includes the blastocyst. In addition, unfertilised ova into which a cell nucleus from a mature human cell has been transplanted or whose division and further development have been stimulated by parthenogenesis are also included in the concept of a human embryo in so far as the use of such techniques would result in totipotent cells being obtained.

116. By contrast, taken individually, pluripotent embryonic stem cells are not included in that concept because they do not in themselves have the capacity to develop into a human being.

117. Furthermore, I consider that an invention must be excluded from patentability, in accordance with that provision, where the application of the technical process for which the patent is filed necessitates the prior destruction of human embryos or their use as base material, even if the description of that process does not contain any reference to the use of human embryos.

118. Lastly, in my view, that provision must be interpreted to the effect that the exception to the non-patentability of uses of human embryos for industrial or commercial purposes concerns only inventions for therapeutic or diagnostic purposes which are applied to the human embryo and are useful to it.

V – Conclusion

119. In view of all the foregoing considerations, I propose that the Court give the following answers to the questions asked by the Bundesgerichtshof:

Article 6(2)(c) of Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions must be interpreted as follows:

– The concept of a human embryo applies from the fertilisation stage to the initial totipotent cells and to the entire ensuing process of the development and formation of the human body. That includes the blastocyst.

– Unfertilised ova into which a cell nucleus from a mature human cell has been transplanted or whose division and further development have been stimulated by parthenogenesis are also included in the concept of a human embryo in so far as the use of such techniques would result in totipotent cells being obtained.

– Taken individually, pluripotent embryonic stem cells are not included in that concept because they do not in themselves have the capacity to develop into a human being.

– An invention must be excluded from patentability where the application of the technical process for which the patent is filed necessitates the prior destruction of human embryos or their use as base material, even if the description of that process does not contain any reference to the use of human embryos.

– The exception to the non-patentability of uses of human embryos for industrial or commercial purposes concerns only inventions for therapeutic or diagnostic purposes which are applied to the human embryo and are useful to it.

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1 – Original language: French.

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2 – OJ 1998 L 213, p. 13.

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3 – This technique is also known as ‘therapeutic cloning’.

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4 – OJ 1994 L 336, p. 1, ‘the TRIPS Agreement’.

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5 – ‘The Munich Convention’.

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6 – ‘The Charter of Fundamental Rights’.

7 – See recitals 3 and 5 in the preamble to that directive.

8 – Convention opened for signature at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro on 5 June 1992 and approved in the name of the European Community by Council Decision 93/626/EEC of 25 October 1993 (OJ 1993 L 309, p. 1). It entered into force on 29 December 1993.

9 – BGBl. 2005 I, p. 2521.

10 – BGBl. 1990 I, p. 2746, 'the ESchG'.

11 – BGBl. 2002 I, p. 2277.

12 – In paragraph 15 of the written observations submitted by Mr Brüstle, neural precursor cells are defined as immature cells which are capable of forming mature nervous system cells, such as neurons.

13 – Paragraph 13 of those written observations states that precursor cells mean immature body cells which are still able to multiply. These precursor cells have the capacity to develop and differentiate into specific mature body cells.

14 – In paragraph 20 of his written observations, Mr Brüstle states that he uses the term 'totipotent' in its strict sense to describe such cells, in contrast with the German legislation which employs the term 'pluripotent'. For reasons of clarity and to avoid confusion, in this Opinion I will use the term 'pluripotent' to describe this kind of cell, since the term is accepted and used by the majority of the scientific community.

15 – Glial cells are the non-neural cells of the nervous system. They do not transmit an electrochemical signal but are indispensable for maintaining the biochemical environment in which neurons work. They represent 70 to 80% of all the cells of the nervous system.

16 – 'Greenpeace'.

17 – The blastocyst stage is reached around five days after fertilisation.

18 – These are induced pluripotent stem cells, known as 'iPS cells'. The embryonic stem cells to which the patent filed by Mr Brüstle relates are called 'ES cells'.

19 – See Case C-377/98 *Netherlands* v *Parliament and Council* [2001] ECR I-7079, paragraph 25.

20 – See recitals 5 to 7 in the preamble to Directive 98/44. See also *Netherlands* v *Parliament and Council*, paragraph 27.

21 – See recital 3 in the preamble to that directive.

22 – See, inter alia, Case C-373/00 *Adolf Truley* [2003] ECR I-1931, paragraph 35 and cited case-law.

23 – See paragraph 18 of the judgment.

24 – See *Netherlands* v *Parliament and Council*, paragraphs 37 to 39, and Case C-456/03 *Commission* v *Italy* [2005] ECR I-5335, paragraph 78.

25 – RT I 1997, 51, 824.

26 – Paragraph 8(1) of the ESchG.

27 – Law available at http://www.legislation.gov.uk/ukpga/1990/37/contents.

28 – Law available at http://www.legislation.gov.uk/ukpga/2008/22/contents.

29 – BOE No 126, 27 May 2006, p. 19947.

30 – BOE No 159, 4 July 2007, p. 28826.

31 – See Article 5(1) of that directive. See also recital 16 in the preamble.

32 – See p. 1 of the Amended proposal for a European Parliament and Council Directive on the legal protection of biotechnological inventions (COM(97) 446 final). See also point 1.4 of Opinion No 878 of the Economic and Social Committee of 11 July 1996 on the Proposal for a European Parliament and Council Directive on the legal protection of biotechnological inventions, available on the ESC website.

33 – See recital 16 in the preamble to that directive.

34 – My emphasis.

35 – See recitals 37 and 39 in the preamble to that directive.

36 – It should be noted in this regard that in the Report from the Commission to the Council and the European Parliament of 14 July 2005 entitled 'Development and implications of patent law in the field of biotechnology and genetic engineering' (COM(2005) 312 final), the Commission points out that, for the same reasons, totipotent cells must be excluded from patentability (point 2.2, fifth paragraph).

37 – See Article 5(1) and recital 16 in the preamble to that directive.

38 – See Article 1(1) of the Human Fertilisation and Embryology Act 1990, as amended.

39 – See Article 2(d) of the Zákon o výzkumu na lidských embryonálních kmenových buňkách (Law on stem cell research, 227/2006 Sb., as amended).

40 – See paragraph 71.

41 – Directive of the European Parliament and of the Council of 31 March 2004 on setting standards of quality and safety for the donation, procurement, testing, processing, preservation, storage and distribution of human tissues and cells (OJ 2004 L 102, p. 48).

42 – See Article 1 of that directive.

43 – It should be noted that in its decision of 25 November 2008, G 2/06, WARF, the Enlarged Board of Appeal of the European Patent Office ruled that it was forbidden to patent claims directed to products which could be prepared exclusively by a method which necessarily involved the destruction of the human embryos from which the said products are derived, even if the said method is not part of the claims.

44 – See recital 42 in the preamble to that directive.

45 – See point 37 of Statement of the Council's Reasons in Common Position (EC) No 19/98 adopted by the Council on 26 February 1998 with a view to adopting Directive 98/44.

46 – It should be noted in this regard that the European Group on Ethics in Science and New Technologies deemed the creation of human embryos for the purpose of stem cell procurement ethically unacceptable (see point 2.7 of Opinion No 15 of 14 November 2000 on ethical aspects on human stem cell research and use, available on the EGE website).