Europäisches Patentamt
European Patent Office
Office européen des brevets

Examination in the field of biotechnology @ the EPO – Part I

DNA/Protein sequences & cells

WIPO National Workshop on Search & Examination of Inventions Related to Genetic Resources

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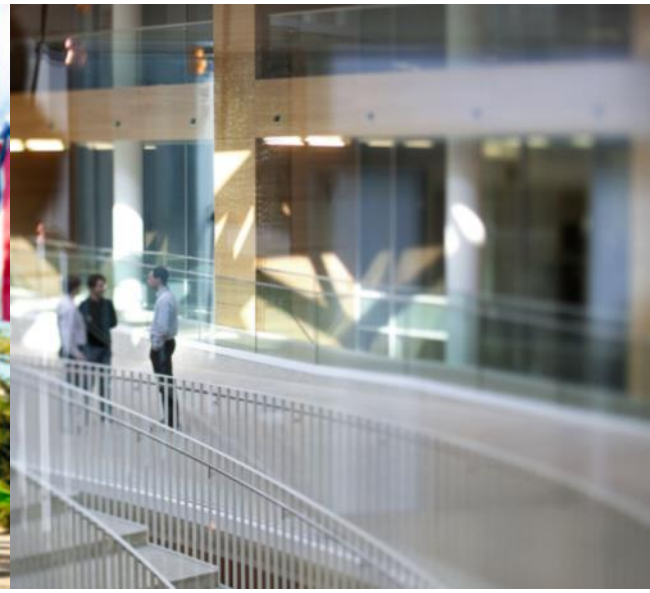
Manila, May 2019





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2 European extension states

Bosnia-Herzegovina • Montenegro

4 Validation states

Morocco - 2015
Moldova - 2015
Tunisia - 2016
Cambodia - 2018

The Legal Framework for Patenting Biotechnological Inventions at the European Patent Office

- **European Patent Convention – EPC** (1973, revised 2000)
  - Implementing Regulations to the EPC
  - Guidelines for Examination in the EPO

- **Case Law of the Boards of Appeal of the European Patent Office**
  - establishes practice
  - rules on how to interpret the law

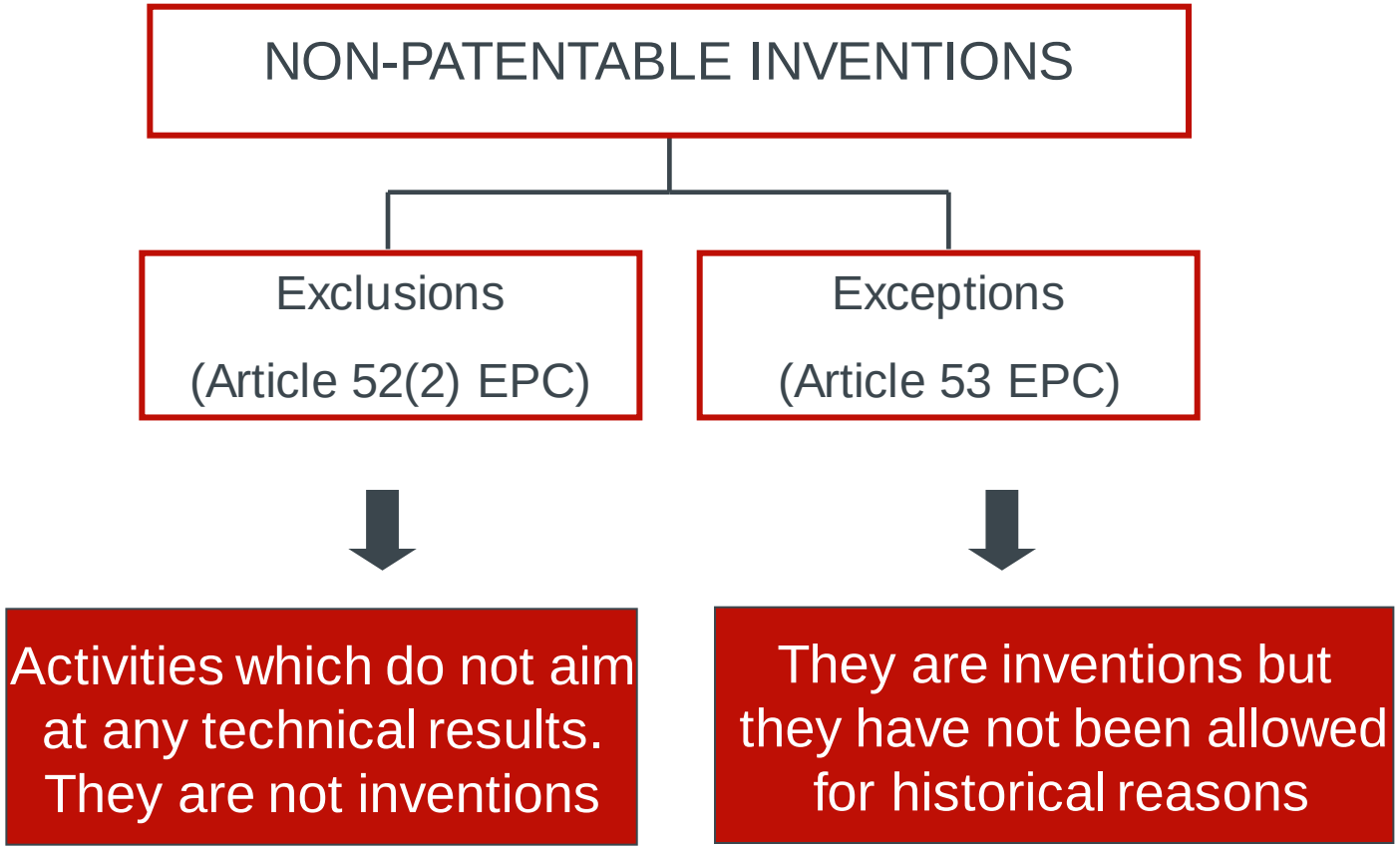
- **Directive 98/44/EC** of the European Parliament and the Council of the European Union of 6 July 1998 on the legal protection of biotechnological inventions
  - implemented into the EPC in 1999
  - shall be used as supplementary means of interpretation (Rule 26 EPC)

Article 52(1) EPC

European Patents shall be granted for **any** inventions in **all fields of technology** provided that they are

- **new**
- involve an **inventive step** and
- are susceptible of **industrial application**.

Exclusions & Exceptions to Patentability



Article 52(2) EPC: the Exclusions (non-inventions)

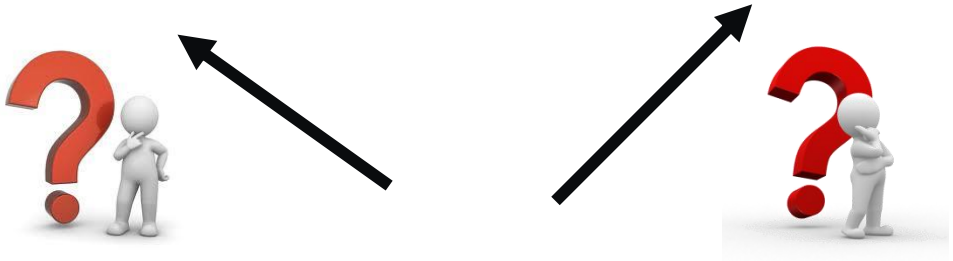
The following in particular **shall not be regarded as inventions** within the meaning of paragraph 1:

- (a) **discoveries, scientific theories and mathematical methods;**
- (b) **aesthetic creations**;
- (c) **schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers**;
- (d) **presentations of information**.

Patentability of Products

NATURALLY OCCURRING COMPOUNDS
“Products of nature”

ARTEFACTS
"Man-made products"



DNA & Protein Sequences

Product of nature doctrine: Barrier to Biotechnology Patents?

- "*One may not obtain a patent on something that is indistinguishable from a product of nature*"

- **Rule 27(a) EPC (Article 3. 2. Directive)**:

  Biological material which is **isolated** from its natural environment or **produced** by means of a technical process shall be patentable **even if it previously occurred in nature**.

Product of nature doctrine: Barrier to Patents on Gene Sequences?

- **Rule 29(1) EPC**

  "The Human body, at the various stages of its formation and development, and the simple discovery of one of its elements, **including the sequence or partial sequence of a gene**, cannot constitute patentable inventions."

- **Rule 29(2) EPC**

  "An element isolated from the human body or otherwise produced by means of a technical process, **including the sequence or partial sequence of a gene**, may constitute a patentable invention, even if the structure of that element is identical to that of a natural element."

Sequences: the function requirement

Rule 29(3) EPC

"The industrial application of a sequence or a partial sequence of a gene **must** be disclosed in the patent application."

N.B. The function of a claimed gene sequence must be credible and non obvious

- medicament (e.g. insulin, growth hormone)
- association with cancer (e.g. diagnosis)
- receptor for specific protein or virus (e.g. drug target)

Credibility requirement for pharmaceutical patent applications

- **No need** to present data from clinical trials / toxicology studies
  - most applications are filed when such data is not yet available!
- Amount/type of data required depends on stage of drug development
- Simple **statement i**n application is generally **not enough**
- Effect needs to be **plausible** at filing date, mere speculation not allowed
- Evaluation **depends on previous knowledge** of product / disease
- Established clinical efficacy not required, most applications refer to *in vitro* or preclinical data
  - **Later data can be used to confirm an effect,**

    never to remedy an insufficient disclosure!

Patentability of DNA / RNA / Proteins

- European patent law contains explicit provisions for the patentability of genes, gene fragments and proteins (Biotech Directive 98/44/EU and Rules 26-29 EPC)

- Case law of the Boards of Appeal of the EPO regarding the patentability of (human) proteins, polynucleotides and genes is consistent, e.g. T870/04, T0898/05, T0641/05, T1540/07, T1452/06, T111/00, T0255/05, T0907/04, T1074/00

- National European case law, e.g. Bundesgerichtshof X ZR 141/13 (Rezeptortyrosinkinase) confirms the above

Human DNA, RNA, proteins

and other biological molecules <u>are</u> patentable

Requirements of European patent applications relating to nucleotide and amino acid sequences

- (1) If nucleotide or amino acid sequences are disclosed in the European patent application, the description shall contain a sequence listing [in computer readable form (WIPO ST25)].

- (2) A sequence listing filed after the date of filing shall not form part of the description. (If late filed, sequences are not published and cannot be referred to in the claims (reference to figures)).

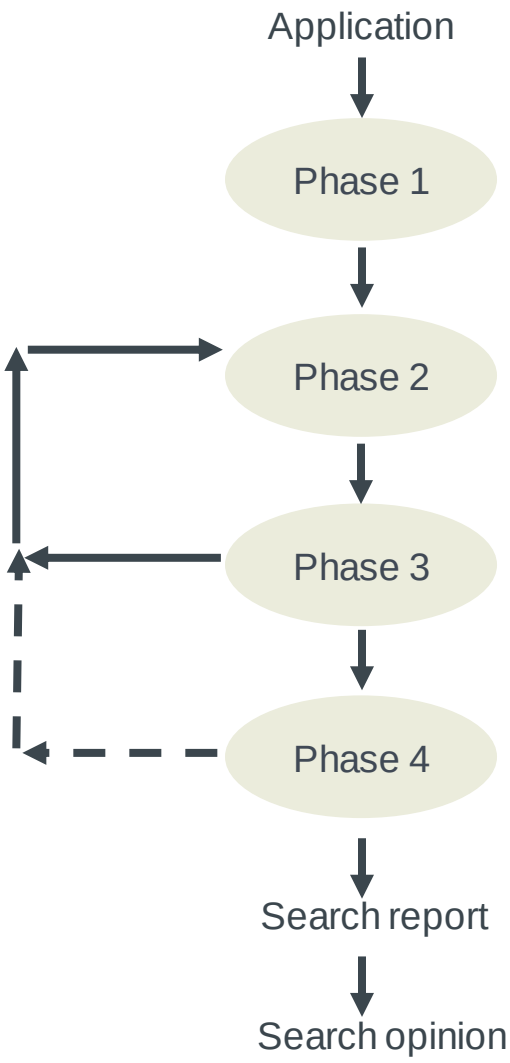
- (3) Where the applicant has not filed a sequence listing complying with the requirements under paragraph 1 at the date of filing, the European Patent Office shall invite the applicant to furnish such a sequence listing and pay the late furnishing fee. If the applicant does not furnish the required sequence listing and pay the required late furnishing fee within a period of two months after such an invitation, the application shall be refused.

Sequences under the PCT

- Where a sequence listing in electronic form and compliant with **WIPO Standard ST.25** is not available to the EPO as IPEA, the applicant may be invited to furnish such a sequence listing under **Rule 13*ter*.1(a)** and to pay the late furnishing fee under **Rule 13*ter*.1(c)** within a non-extendable period of **one month** from the date of the invitation.

- Where the applicant has not filed an electronic sequence listing conforming to **WIPO Standard ST.25** in response to a request from the ISA, or has not paid the late furnishing fee, the WO-ISA will indicate under Section III that **the written opinion is limited to the same extent as the search was limited** because the applicant failed to comply with **Rule 5.2** (no sequence listing) and/or **Rule 13*ter*.1(a)** (no computer-readable sequence listing).

Flow chart for search strategy



- Analysis of the application
- Harvesting of information
- Compilation of **search table**

- Technical search

- Preliminary examination
- Determination of prior art "at hand"

- Through evaluation of the documents found
- Preparation of search report and search opinion

Adapt/modify search approach

Resume searching (if necessary)

Example

A pharmaceutical composition comprising Aspirin

and Spirulina,

in the form of liposomes,

for use in the treatment of migraine.

Search table

and

or

Aspirin	Spirulina	Migraine	Liposomes
A61K31/616	A61K35/748		A61K9/127
Acetylsalic. acid	Blue green algae	Hemicrania Cephalgia	Liposome Vesicle
Structure			

What databases

does an EPO examiner consult

during a search of a

biotech-related application

?

INTERNAL DATABASES

PATENT LITERATURE DATABASES

- **Abstracts databases**
- **Full-text patent databases**

NON PATENT LITERATURE DATABASES

- **Abstracts databases**

  BIOSIS, EMBASE, MEDLINE, FSTA, KJTK, PUBCHEM,...

  COMPENDEX, INSPEC, IBM TDB,...

  NPL
- **Full-text non-patent databases**
  - ACM, AIP, IEEE, IOP, LNCS,...
  - ELSEVIER, SPRINGER,...
  - RD, IPCOM,...
  - OAC,...

INTERNAL DATABASES

Biosis: biological and biomedical abstracts;
Embase: biomedical and pharmacological data (4000 journals from 70 countries);
FSTA: Food Science Technology abstracts (1800 journals since 1969, 1500 other references);
KJTK: Korean Journal of Traditional Knowledge (47 KR journals: oriental medicine, pharrma, sitology, biology,...);
Medline: abstracts of the US national Library medicine;
Pubchem: biological activities of small molecules compounds and substances;
Compdx: Computerized Engineering index (4500 journals since 1970);
Inspec: Information services for Physics, Electronics and Computing;
TDB: IBM technical disclosure bulletin (since 1998 in research disclosure);
NPL: bibliographic data for NPL documents

EXTERNAL DATABASES (maintained by external providers but accessible via an EPO interface)

STN / Chemical Abstracts: provides global access to published research, journal literature, patents, structures, sequences, properties, and other data from the most renowned database producers worldwide**. Epoque language in queries is possible**

Classification databases (CPC, ICLA, IPC,...)
Legal databases (APC, CONV,...)
Field specific databases (ALLOYS, SADIQ,...)
Google, Google Scholar, Google Patent, Wayback Machine

Relevant information accessible on the **internet**

- **Ebooks collections:** constitute supportive information sources, i.e. they provide useful technical background information - instead of primary prior-art information, to examiners
- **Online databases:** available via external supplier (browser based databases) such as the global new products database from Mintel or Integrity from Thomson Reuters
- **Dictionaries & Encyclopaedias:** most of which are freely available on the Internet.
- **Academic publications:** Dissertations and Thesis, Conference Proceedings, online journals (~10.300 in May 2017)
- **Traditional Knowledge Portal:** Provides documentation related to issues around the subject of TK (taxonomic and TK related databases with global or regional coverage, journals, books, reference libraries)

Supreme Court of the United States
Decision of 13.06.2013 (“Myriad”)

Human genes cannot be patented, even when isolated from the body

Justice Clarence Thomas:

- A "groundbreaking, innovative, or even brilliant discovery does not by itself satisfy" federal law's requirements for a patent.
- "Separating (a) gene from its surrounding genetic material is not an act of invention."
- "The lab technician unquestionably creates something new when cDNA is made,"

BRCA1 and BRCA2 gene patents in Europe

- Patents granted at the EPO
  - BRCA1 and BRCA2 genes
  - methods for diagnosing a predisposition to breast cancer by screening for mutant gene variants

- Several patents underwent opposition and appeal proceedings e.g. T1213/05, T0666/05, T080/05 (BRCA-1), T0156/08, T0902/07 (BRCA-2)

- Final versions more limited in scope than originally granted patents, **but general patentability not questioned**

Questions?

Article 52(1) EPC

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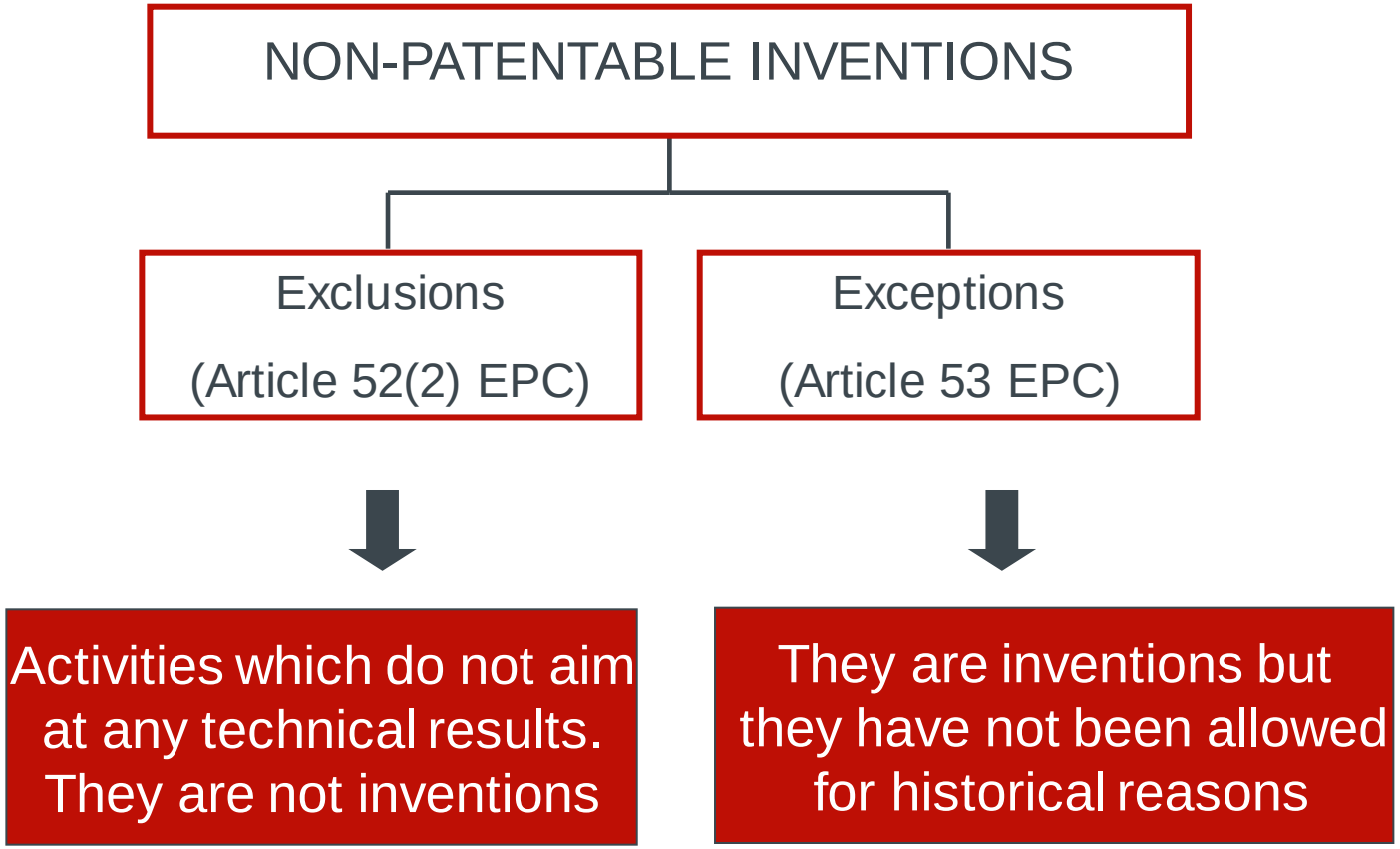
Exclusions & Exceptions to Patentability



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Article 53 EPC: the Exceptions

European patents **shall not be granted** in respect of:

- (a) inventions the commercial exploitation of which would be contrary to **"ordre public"** or **morality**; [...];
- (b) **plant or animal varieties** or **essentially biological processes** for the production of plants or animals; [...];
- (c) **methods for treatment** of the human or animal body by surgery or therapy and diagnostic methods practised on the human or animal body; [...]

Article 53 EPC: the Exceptions

European patents **shall not be granted** in respect of:

- (a) inventions the commercial exploitation of which would be contrary to **"ordre public"** or **morality**; [...];
- [...];
- [...]

Article 53(a) EPC: the Exceptions

=> Patent Offices can be held morally accountable

=> Patenting is not morally neutral

Article 53(a) EPC: “Ordre public” & Morality

- **“Ordre public”**
  - Protection of public security
  - Protection of physical integrity of individuals
  - Protection of the environment

- **Morality**
  - Morality is related to the totality of accepted norms of right and wrong in a particular culture. For the purposes of the EPC, the culture in question is the one inherent in European society and civilization.
  - Case Law: **“Conventionally accepted standards of conduct of European culture”** (T 356/93)

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Cambodia - 2018

Directive 98/44/EC I

of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions

Purpose:

- To harmonise the laws and practices of member states on biotechnological inventions.

Objectives:

- To clarify the distinction between what is patentable and what is not patentable in the field of biotechnology.
- To confirm that the entire human body may not be regarded as a patentable invention.

Implementation:

- In national law: (DK, FI, GB and IR)
- In the EPC

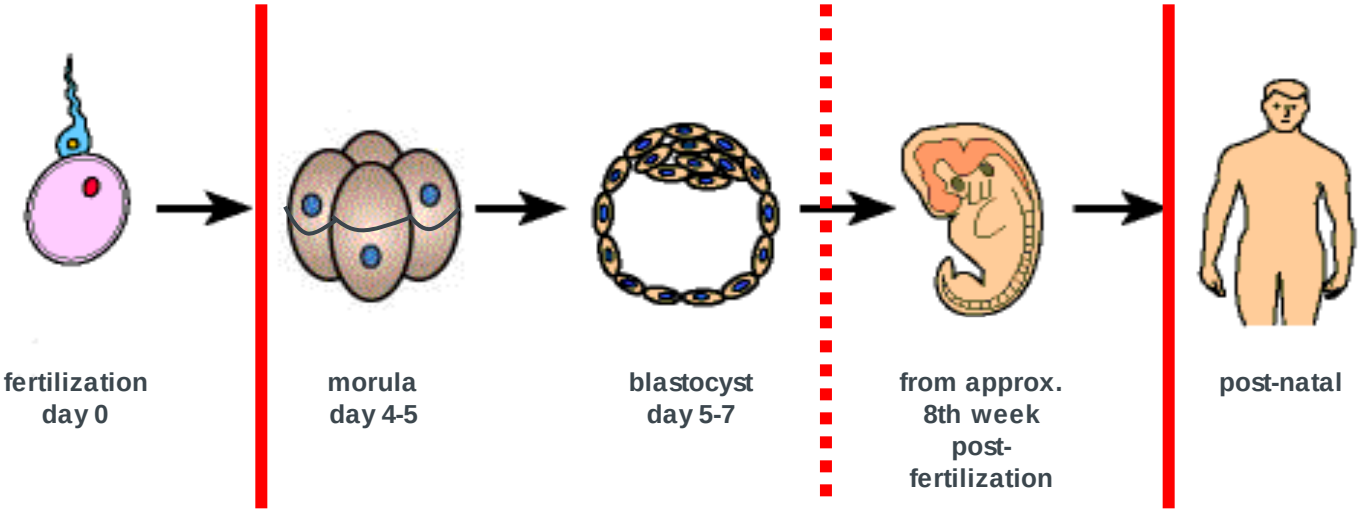
Directive 98/44/EC II

of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions

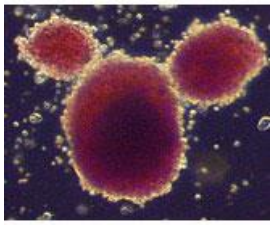
- **Recital 16:** "[...] *patent law must be applied so as to respect the fundamental principles safeguarding the dignity and the integrity of the person*;"

- **Recital 38:** "[...] *processes the use of which offend against human dignity [...] are obviously also excluded from patentability*;"

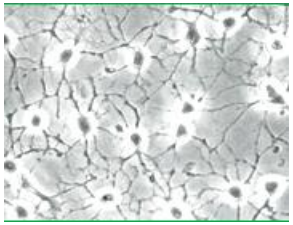
Sources of Human Stem Cells



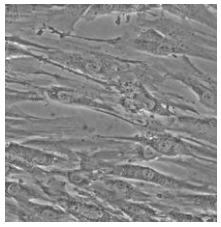
Embryonic Stem Cells



Fetal Stem Cells



Adult Stem Cells



Rule 28 EPC (Article 6.2(c) of Directive 98/44/EC)

Under Article 53(a) EPC, European patents shall not be granted in respect of biotechnological inventions which, in particular, concern the following:

- **(a) processes for cloning human beings;**
- **(b) processes for modifying the germ line genetic identity of human beings;**
- **(c) uses of human embryos for industrial or commercial purposes;**
- **(d) processes for modifying the genetic identity of animals which are likely to cause them suffering without any substantial medical benefit to man or animal, and also animals resulting from such processes.**

Decision G2/06 of the Enlarged Board of Appeal

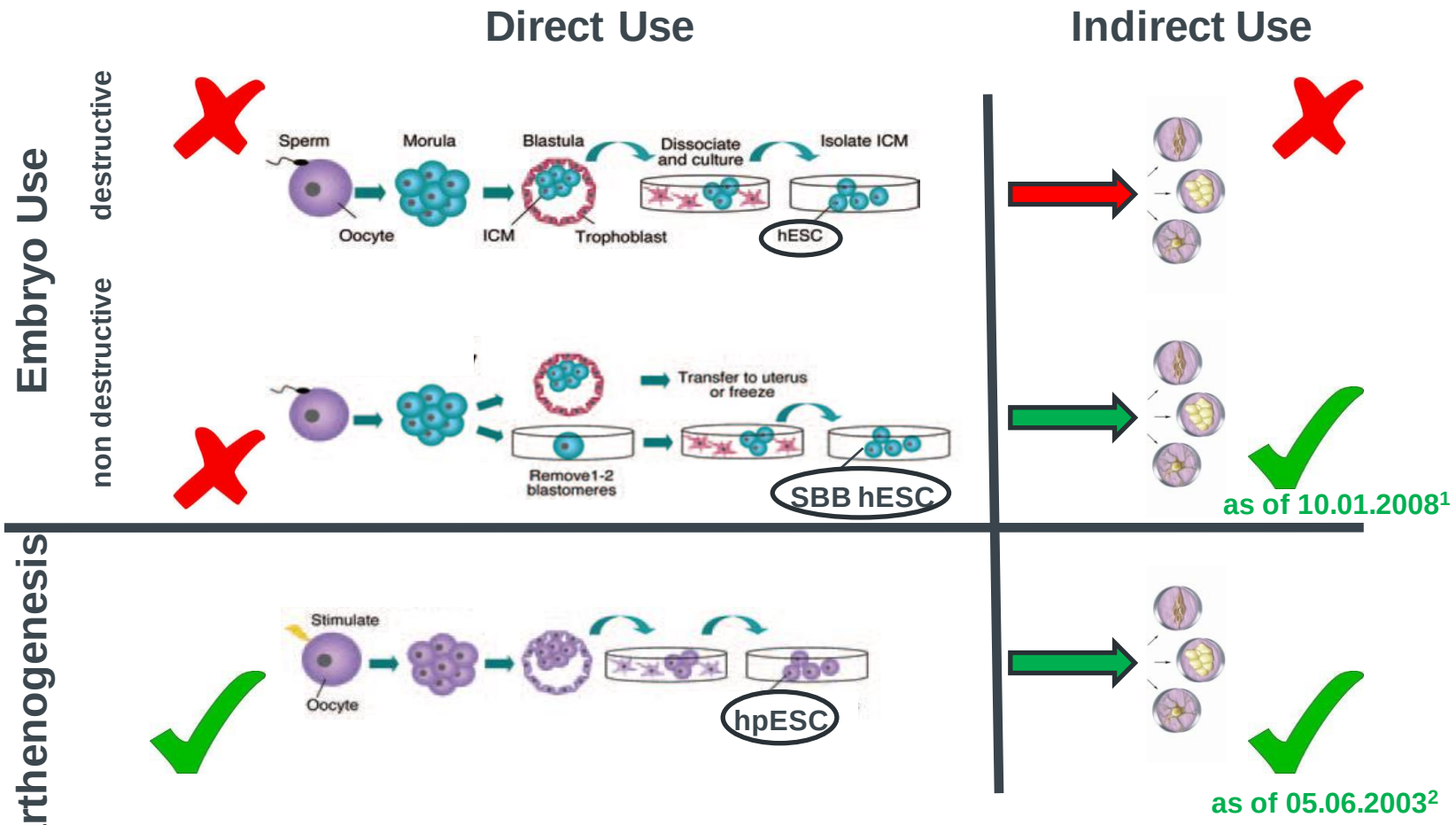
of 25.11.2008

- **Human stem cell cultures which at the filing date can only be obtained by destroying human embryos are not patentable, even if the destruction is not part of the claims.**

- Given the purpose to protect human dignity and prevent the commercialization of embryos, the term "embryo" is not to be given any restrictive meaning.

- This decision is not concerned with the general question of patentability of inventions relating to human stem cells or stem cell cultures.

The 6 scenarios of embryo use



[1] Chung Y et al. (2008)

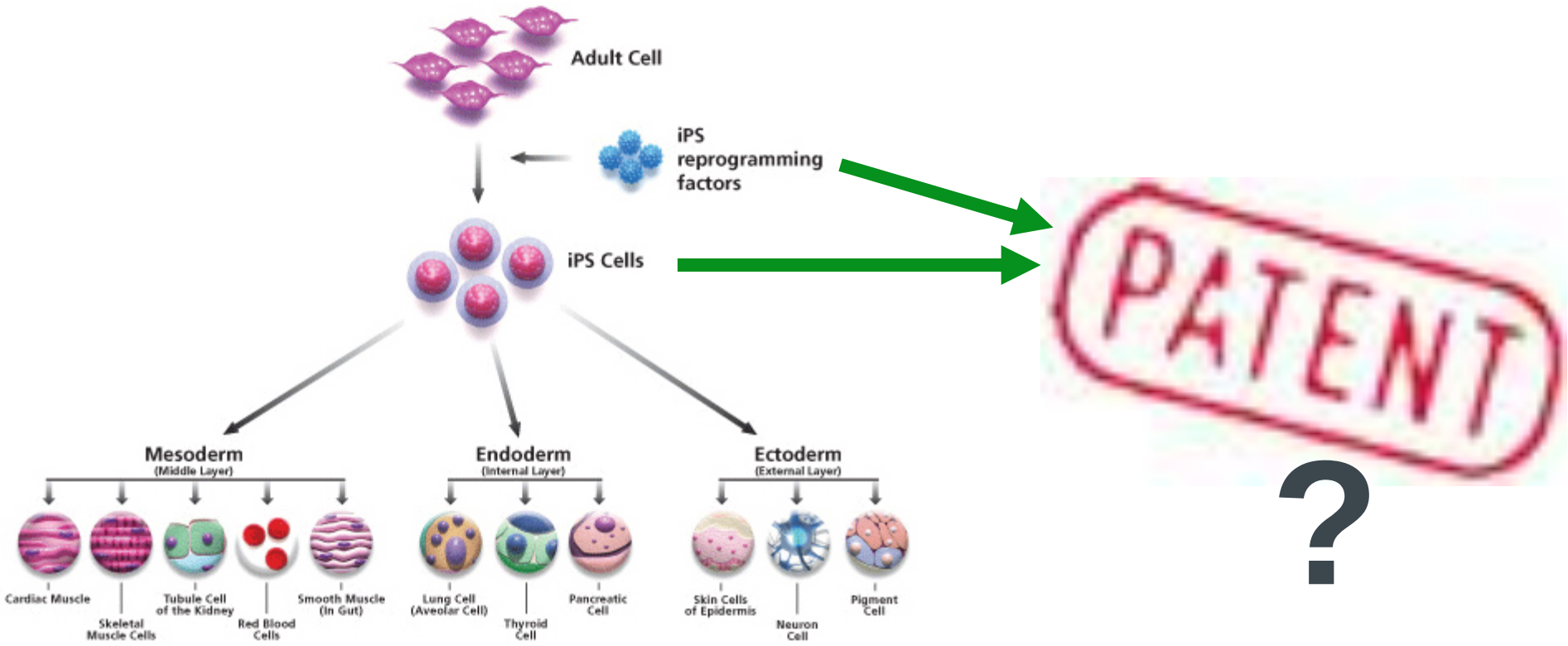
[2] WO03046141 (2003) Methods for making and using reprogrammed human somatic cell nuclei and autologous and isogenic human stemcells

Patentability of Products for Human Embryonic Cell Culture

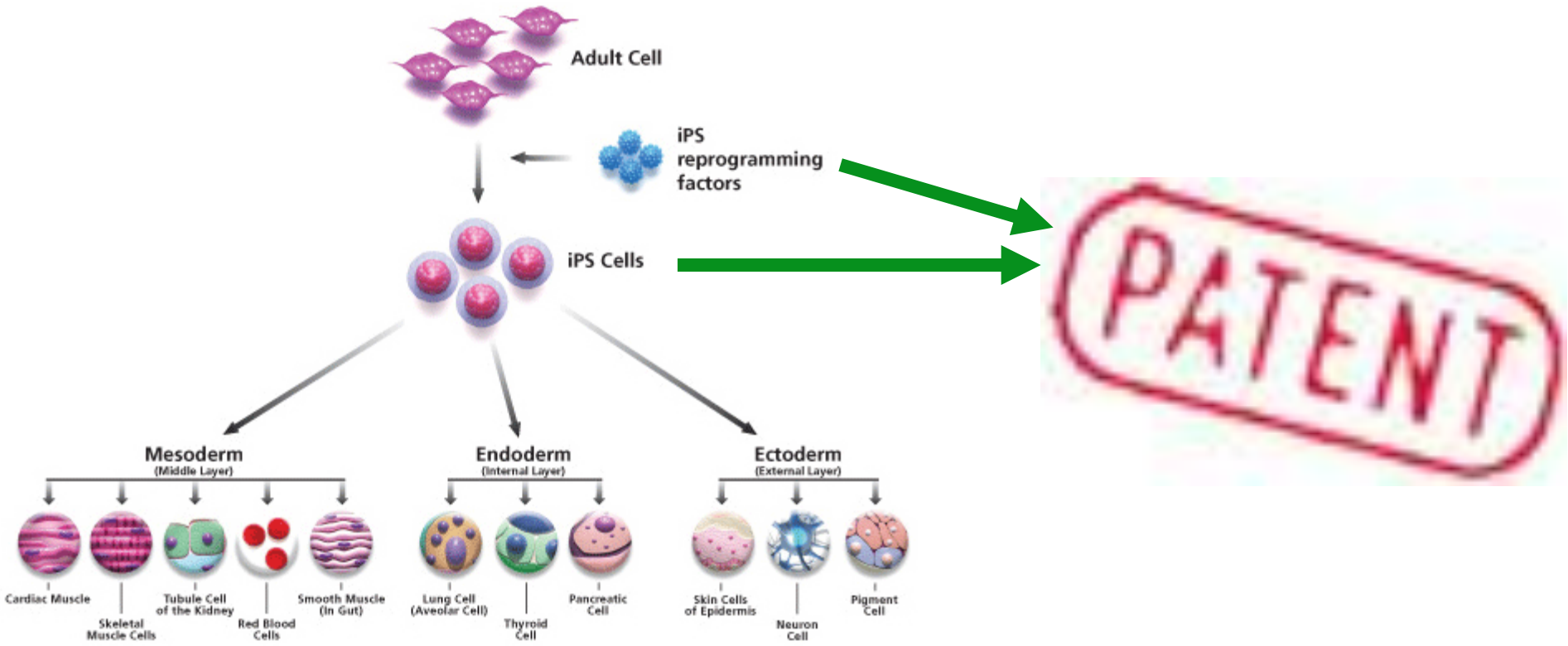
Culture media, supports or apparatuses "suitable for" use with human embryonic cells, or even "specifically designed" for this purpose, are not per se excluded from patentability.

Their production normally does not require the use of human embryos as base material.

Patentability of iPS cells



Patentability of iPS cells



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