Europäisches Patentamt
European Patent Office
Office européen des brevets

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

Plants/animals & medical methods

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

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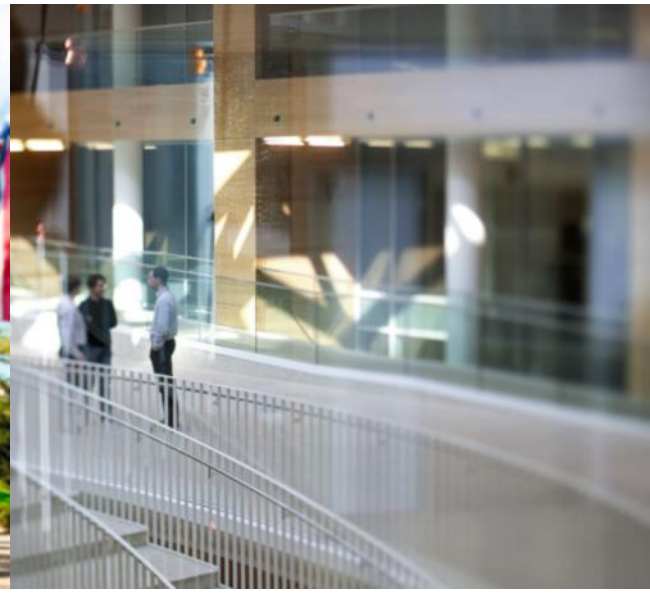
Manila, May 2019





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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

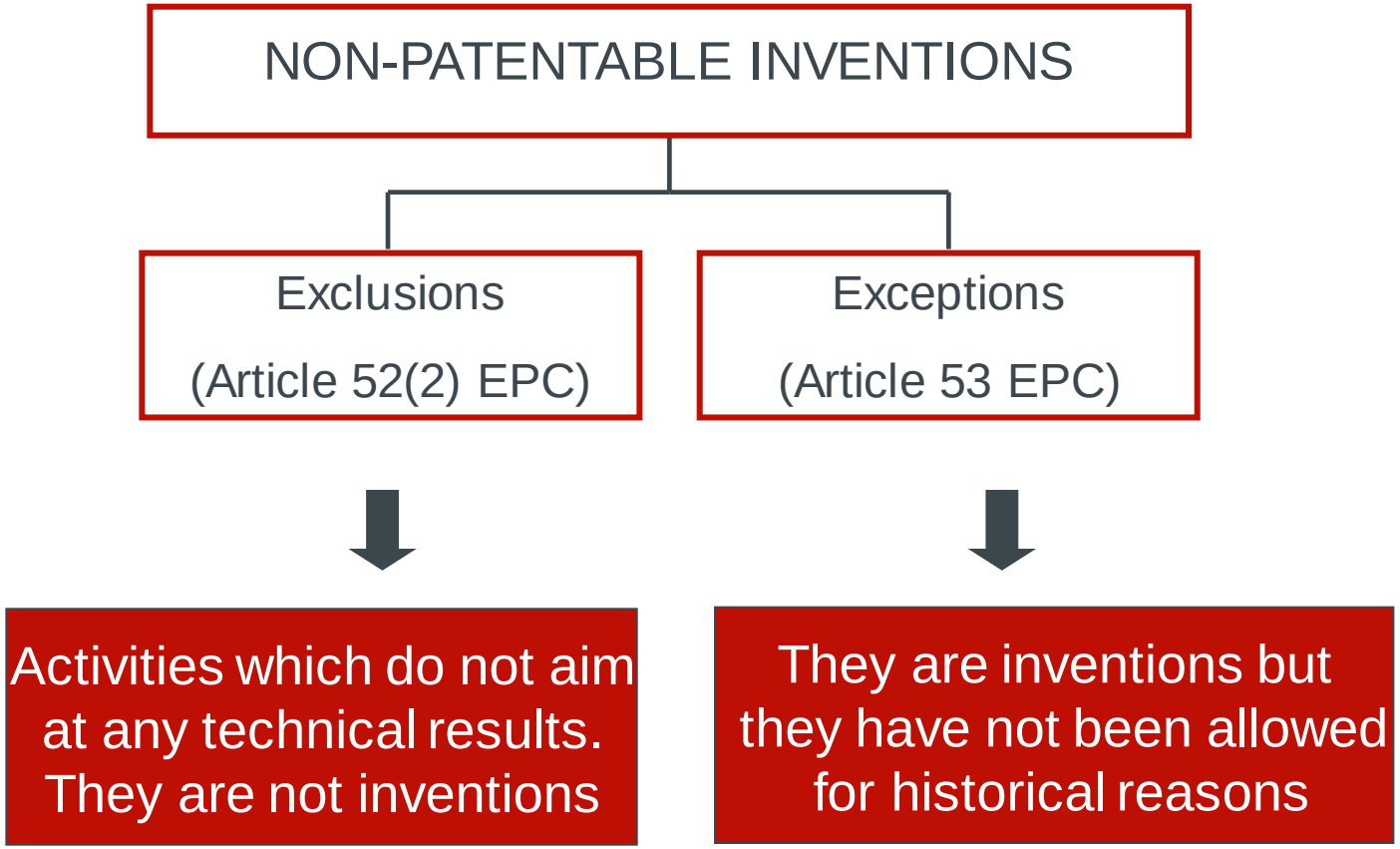
- **Directive 98/44/EC** of the European Parliament and the Council of the European Union of 6 July 1998 on the legal protection of biotechnological inventions
  - implemented into the EPC in 1999
  - shall be used as supplementary means of interpretation (Rule 26 EPC)

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**.

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**.

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:

- [...];

- (b) **plant or animal varieties** or **essentially biological processes** for the production of plants or animals; [...];

- [...]

Patentability of Animals

Rule 27: Patentable Biotechnological Inventions (Article 4.2 Directive 98/44/EC)

Biotechnological inventions shall also be patentable if they concern:

- (a) biological material which is isolated from its natural environment or **produced by means of a technical process** even if it previously occurred in nature;
- **(b) plants or animals if the technical feasibility of the invention is not confined to a particular plant or animal variety**;
- (c) a microbiological or other technical process, or a product obtained by means of such a process other than a plant or animal variety

NB: The Directive provides for farmers' exemption. Farmers are allowed to breed their animals for their own farming-related use.

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.**

Balancing Suffering against Medical Benefit

- The substantial medical benefit referred to in Rule 28(d) EPC includes any benefit in terms of research, prevention, diagnosis or therapy (EU Dir. 98/44/EC, rec. 45).

- For the balancing exercise 3 things need to be considered (T315/03 "oncomouse II")
  - animal suffering
  - medical benefit
  - the necessary correspondence between the two in terms of the animals in question

- The test ensures that a patent extends only to those animals whose suffering is balanced by a medical benefit.

- The level of proof is the same for both animal suffering and substantial medical benefit, namely likelihood (T 1262/04).

Summary: Patentability of Animals

Article 53(b) EPC

- "European patents shall not be granted in respect of plant or animal varieties or essentially biological processes for the production of plants or animals; [...]."

Rule 27(b) EPC (Article 4.2. Directive 98/44/EC)

- Inventions which concern plants or animals shall be patentable if the technical feasibility of the invention is not confined to a particular plant or animal variety.

G1/98

- A claim wherein specific animal varieties are not individually claimed is not excluded from patentability, even though it may embrace animal varieties.

Rule 28(d) EPC (Article 6(d) Directive 98/44/EC)

- Processes for modifying the genetic identity of animals which are likely to cause them suffering without substantial medical benefit to man or animal, and also animals resulting from such process are not patentable

Questions?

Patentability of Plants

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:

- [...];

- (b) **plant or animal varieties** or **essentially biological processes** for the production of plants or animals; [...];

- [...]

Patentability of Plants

Article 53(b) EPC

- plant varieties or essentially biological processes for the production of plants are not patentable

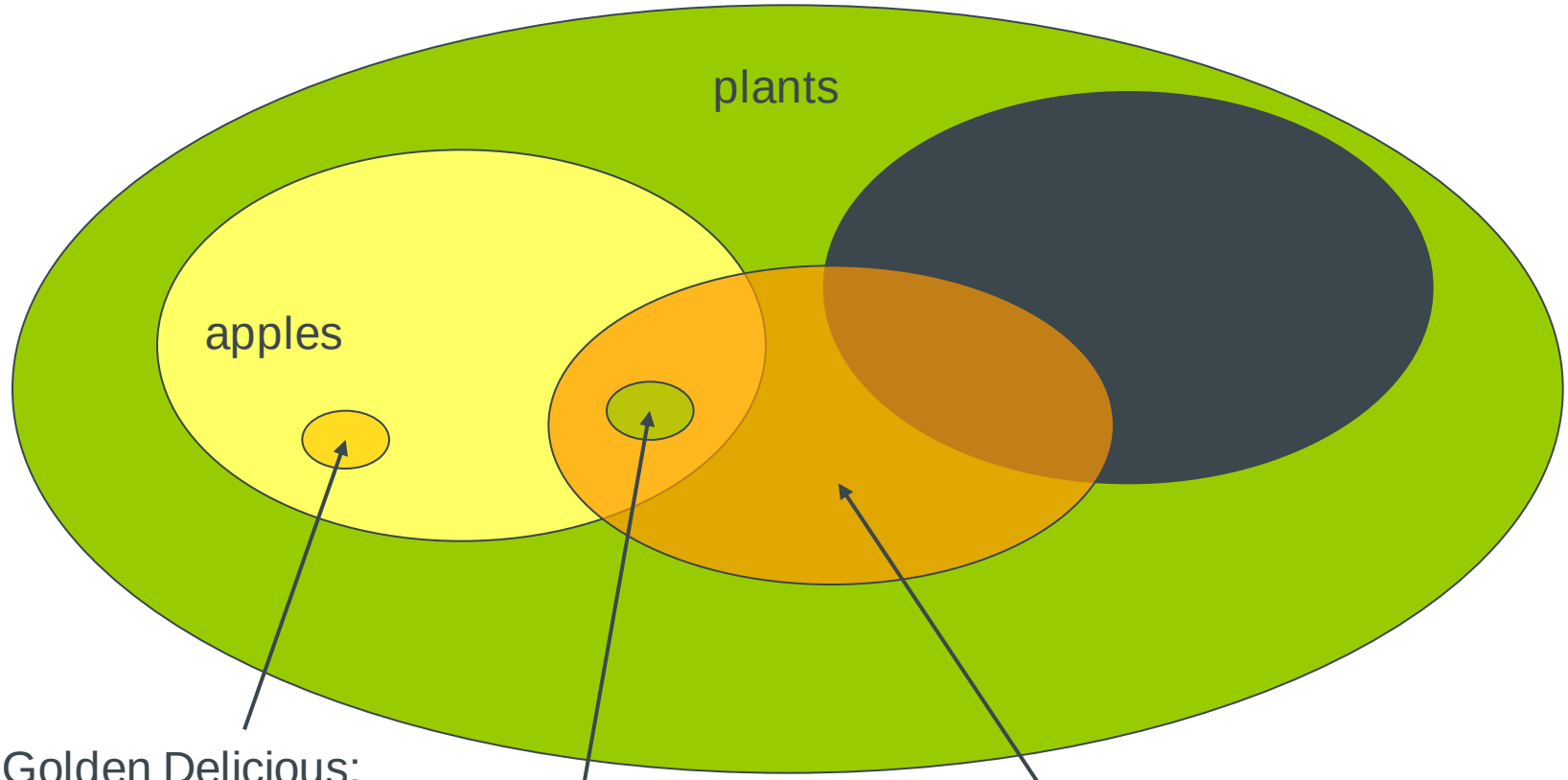
Rule 27(b) EPC

- plants are patentable if the technical feasibility of the invention is not confined to a particular plant variety

G1/98

- a patent claim in which specific plant varieties are not individually claimed is not excluded from patentability, even though it may embrace plant varieties

Plants versus Plant Varieties



Golden Delicious:
not patentable (variety)

Variety A containing gene X:
not patentable (variety)

Plants containing gene X for increasing Vitamin C content:
patentable

Rule 26(4) EPC: Definition of “Plant variety”

- "Plant variety" means any **plant grouping within a single botanical taxon of the lowest known rank**, which grouping, irrespective of whether the conditions for the grant of a plant variety right are fully met, can be:
  - (a) defined by the expression of the characteristics that results from a given genotype or combination of genotypes,
  - (b) distinguished from any other plant grouping by the expression of at least one of the said characteristics, and
  - (c) considered as a unit with regard to its suitability for being propagated unchanged.

- See also Article 2(3) Directive 98/44/EC together with Article 5(2) Community plant variety rights Regulation; Article 1(iv) UPOV Convention 1991 as well as decision G 1/98 (reasons 3.1 and 3.8).

Patentability of Essentially Biological Processes

EP 1 069 819 (T 83/05, G 2/07, broccoli)

Method for production of *Brassica o.*, comprising steps of **crossing and selection**, wherein molecular markers are used to identify desired hybrids

EP 1 211 926 (T 1242/06, G 1/08, wrinkled tomato)

Method for breeding tomato plants that produce tomatoes with reduced fruit water content, comprising **crossing and selection** steps, followed by allowing fruit to dry partially on the vine, and screening the fruit for reduced water content.

Decisions G2/07 and G1/08 (Tomatoes I/Broccoli I)
of 9.12.10

- Breeding methods for the production of plants which contain or consist of the steps of **sexually crossing the whole genomes of plants and of subsequently selecting plants** is in principle **excluded from patentability** as being "essentially biological" within the meaning of Article 53(b) EPC, **even if it contains a step of a technical nature.**

- If however, such a process contains within the steps of sexually crossing and selecting an additional step of a technical nature, which **introduces or modifies a trait in the genome of the plant produced** which cannot be the result of mixing of genes, **then the process is not excluded.**

N.B. The patentability of products (i.e. plants/animals) resulting from such processes has not been part of the referrals and is not discussed in these decisions.

EPO practice after broccoli/tomato rulings on breeding methods for plants

- Breeding methods for plants or animals which contain steps of crossing and selection are **not patentable**.
- Marker-assisted breeding of animals or plants also **not patentable.**
- Genetic engineering methods for introducing new traits into plants or animals **are patentable**.

Examples of Claims

Excluded from patentability under Art. 53(b) EPC:

1. Method for the production of plants having trait X comprising crossing plants A and B, and selecting progeny having marker X.
2. Use of a (transgenic) plant for generating further plants.
3. Introgression of a (transgenic) trait X into a plant.
4. Methods for plant breeding comprising the step of embryo rescue.

Not excluded from patentability under Art. 53(b) EPC:

1. Method of producing a (transgenic) plant having trait X by introducing a vector comprising the sequence of SEQ ID NO: 1.
2. Method for selecting animals having phenotype Y by screening for the presence of a marker having the sequence shown in SEQ ID NO: 1.
3. Use of the nucleic acid of SEQ ID NO: 1 to select a plant having trait X.

Decisions G2/12 and G2/13 (Tomatoes II/Broccoli II)
of 25.3.15

Question:

Can the exclusion of essentially biological processes for the production of plants in Article 53(b) EPC have a negative effect on the allowability of a product claim directed to plants or plant material such as a fruit?

Answer:

The exclusion of essentially biological processes for the production of plants in Article 53(b) EPC does not have a negative effect on the allowability of a product claim directed to plants or plant material such as a fruit.

Summary: Patentability of Plants

Article 53(b) EPC

- "European patents shall not be granted in respect of plant or animal varieties or essentially biological processes for the production of plants or animals; [...]."

Rule 27(b) EPC (Article 4.2. Directive 98/44/EC)

- Inventions which concern plants or animals shall be patentable if the technical feasibility of the invention is not confined to a particular plant or animal variety.

G1/98

- A claim wherein specific plant varieties are not individually claimed is not excluded from patentability, even though it may embrace plant varieties.

Questions?

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; [...]

Medical use claims under the EPC

Exception from patentability, Art. 53(c) EPC:

European patents shall not be granted in respect of methods of treatment of the human or animal body by surgery or therapy and diagnostic methods practised on the human or animal body; this provision shall not apply to products, in particular substances or compositions, for use in any of these methods.

Restrictions on Medical Inventions

- **The TREATMENT of the human or animal body by *therapy***
- **The TREATMENT of the human or animal body by *surgery***
- **The DIAGNOSIS of diseases in the human or animal body**

Problem

- **How to protect a medical invention?**

Solution

- **Through purpose-limited product claims!**

Medical use claim = purpose-limited product claim

First medical use (Article 54(4) EPC):
"Compound X / Composition comprising X **for use as a medicament**"

Medical use renders claim novel if no previous generic or specific medical use disclosed.

If a previous medical use is disclosed in the prior art, then:

Second (or further) medical use (Article 54(5) EPC):
"Compound X / Composition comprising X **for use in a method for the treatment of disease Y**"

"Compound X **for use in the treatment of disease Y further characterised by dosage, dosage regimen, administration route, patient group**"

Medical use wording

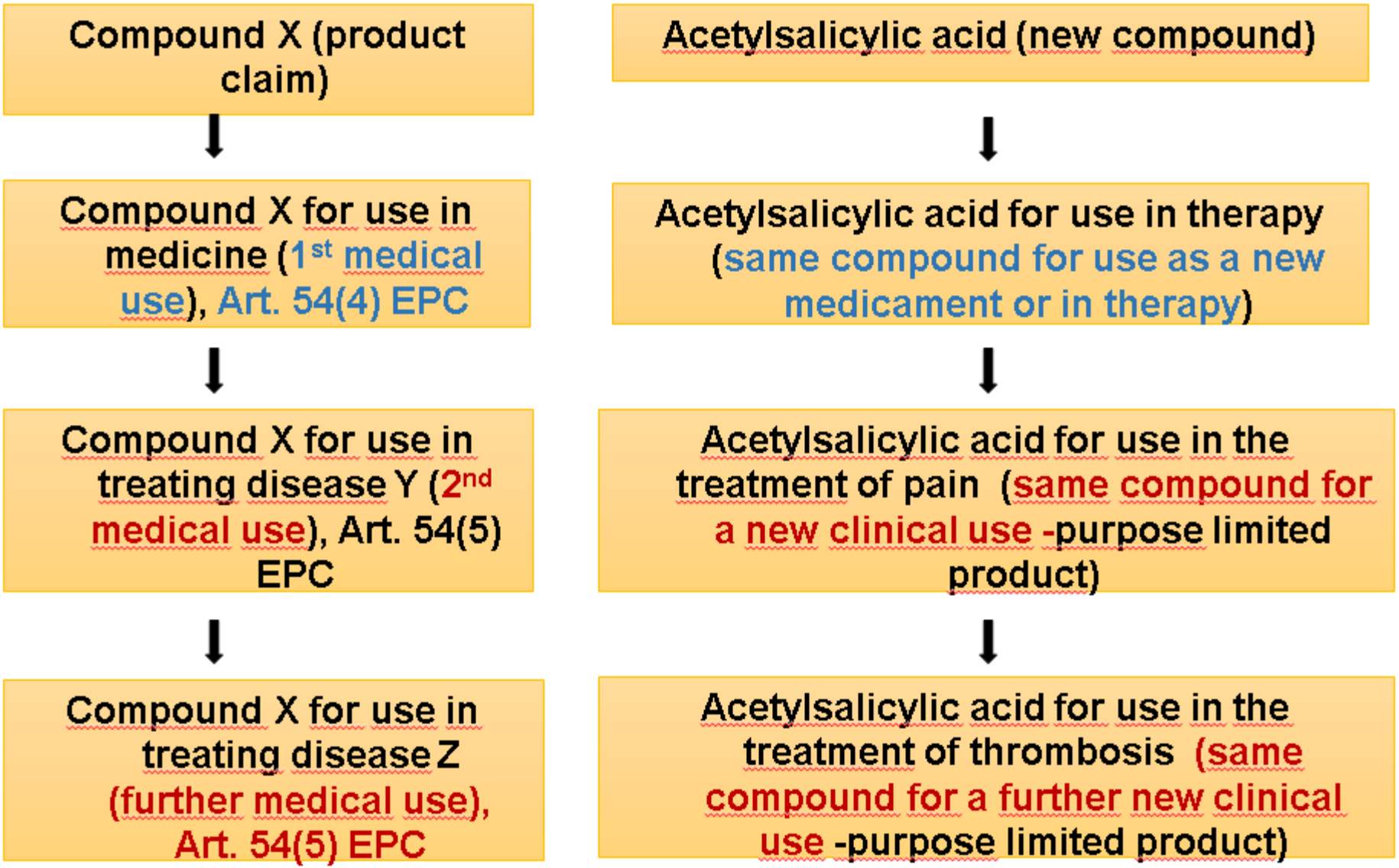
-> Acetylsalicylic acid for use as a medicament. (**First medical use**)

-> Acetylsalicylic acid for use in therapy. (**First medical use**)

-> Acetylsalicylic acid for use in the treatment of pain. (**Further medical use**)

-> Acetylsalicylic acid for use as a anticoagulant. (**Further medical use**)

- Only purpose-limited product claim “medical use” wording is accepted by the EPO (29/01/2011).


Compound X (product claim)
Compound X for use in medicine (1st medical use), Art. 54(4) EPC
Compound X for use in treating disease Y (2nd medical use), Art. 54(5) EPC
Compound X for use in treating disease Z (further medical use), Art. 54(5) EPC
Acetylsalicylic acid (new compound)
Acetylsalicylic acid for use in therapy (same compound for use as a new medicament or in therapy)
Acetylsalicylic acid for use in the treatment of pain (same compound for a new clinical use -purpose limited product)
Acetylsalicylic acid for use in the treatment of thrombosis (same compound for a further new clinical use -purpose limited product)

Second medical use: the claim formats

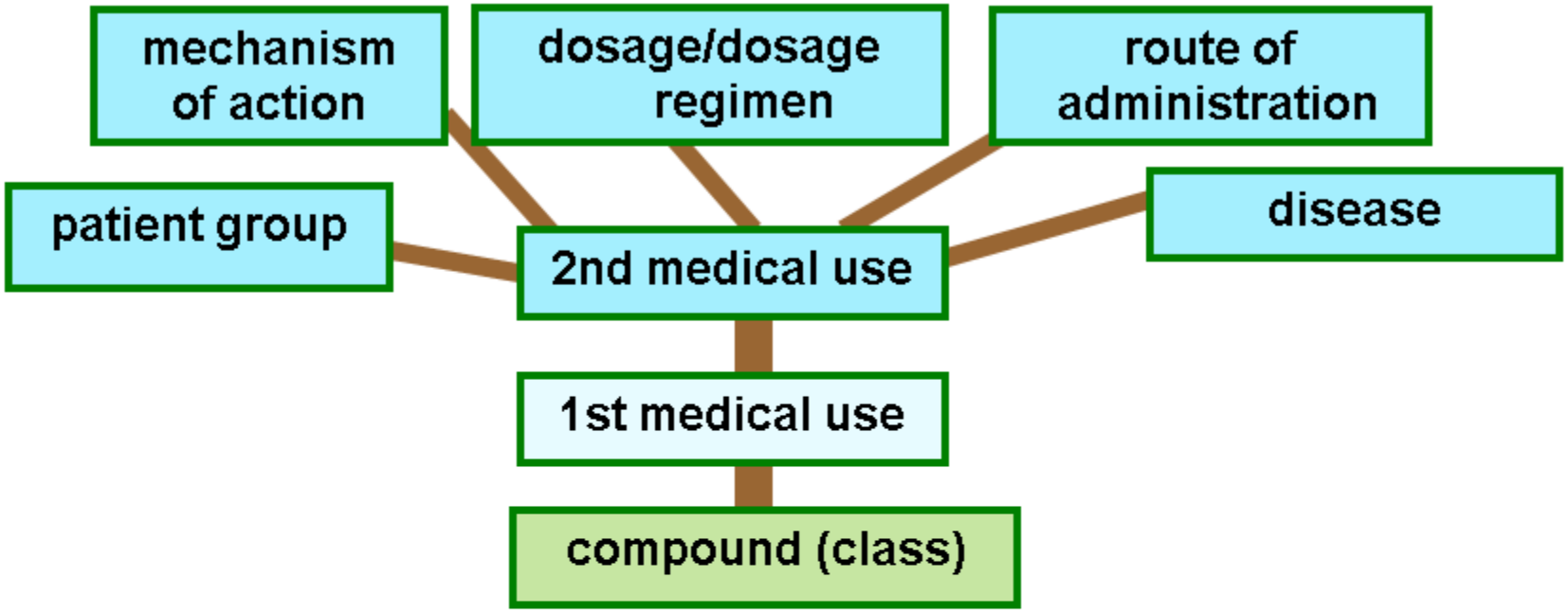
Compound X/ Composition comprising X for use

- **in a method for the treatment of Y, or**
- **in the therapy of Y, or**
- **in a method of treating Y, or**
- **in a method of therapy of Y, or**
- **as a medicament defined by its function (e.g. as an anti-inflammatory medicament)**

Further medical use

Article 54(5) EPC explicitly allows **further patent protection** of substances or compositions **already known as medicines** provided their use in a method under Article 53(c) EPC be **specific and not comprised in the state of the art**.

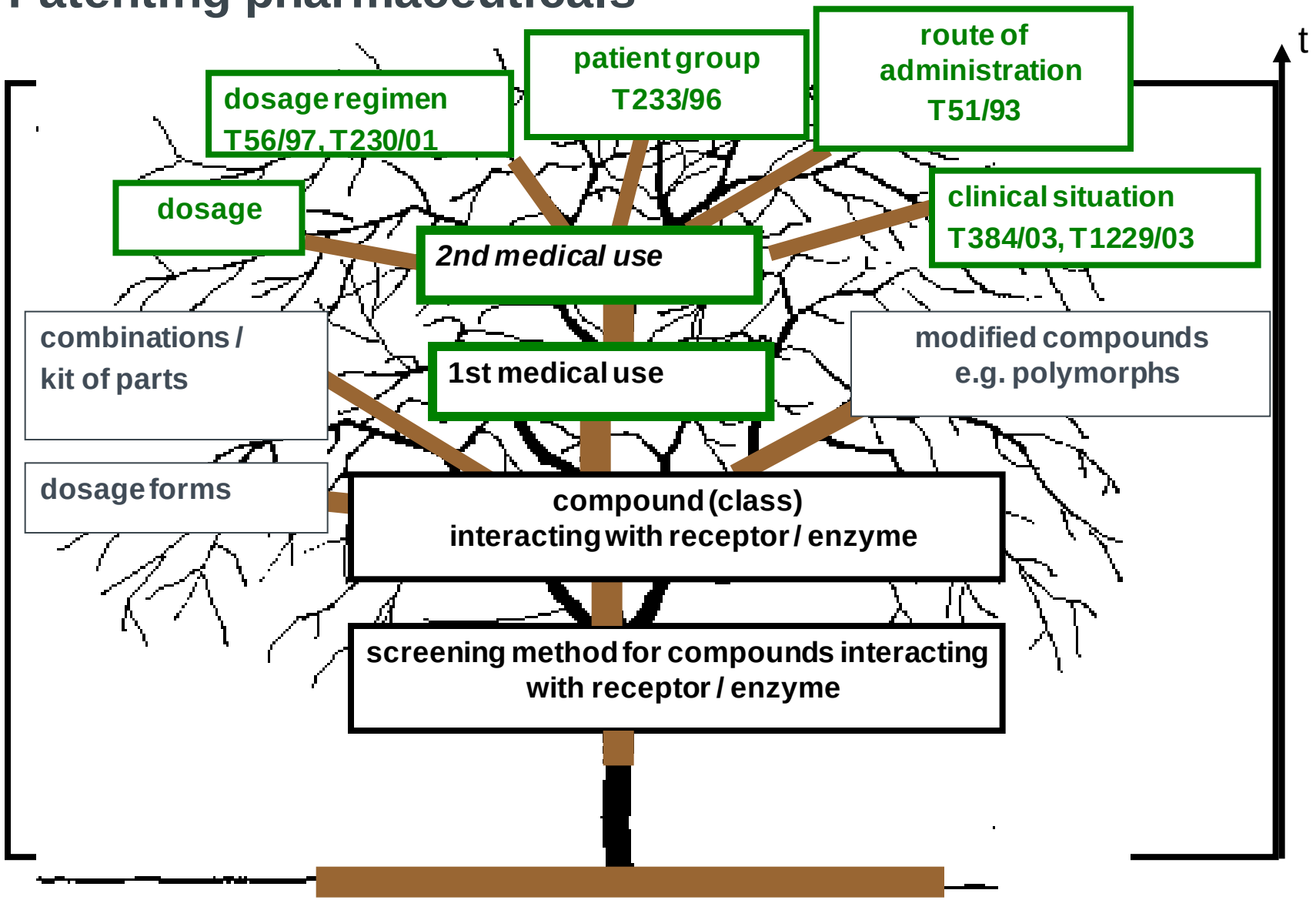
Further medical use: distinguishing features



New therapeutic applications can be based on

1. a different disease
2. a new group of patients
3. a different mode of drug administration
4. a different dosage regimen
5. a new clinical situation

Patenting pharmaceuticals



Personalised medicine

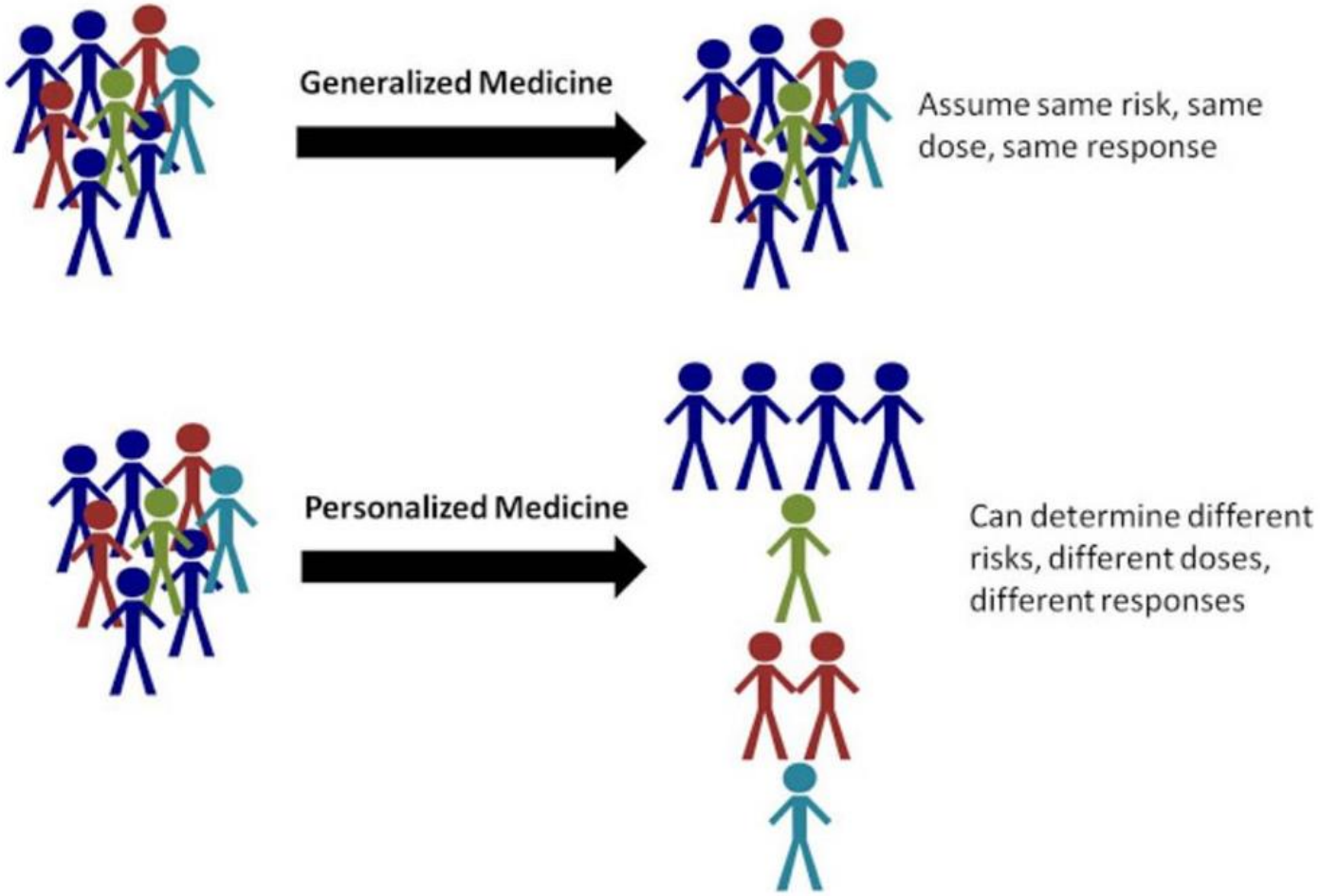
Selection of patient population :

- **<u>for better definition of the disease and/or its prognosis</u>**: disease sub-type or disease severity (e.g. Her-2 and breast cancer, or *Philadelphia chromosome* in chronic myeloid leukaemia).

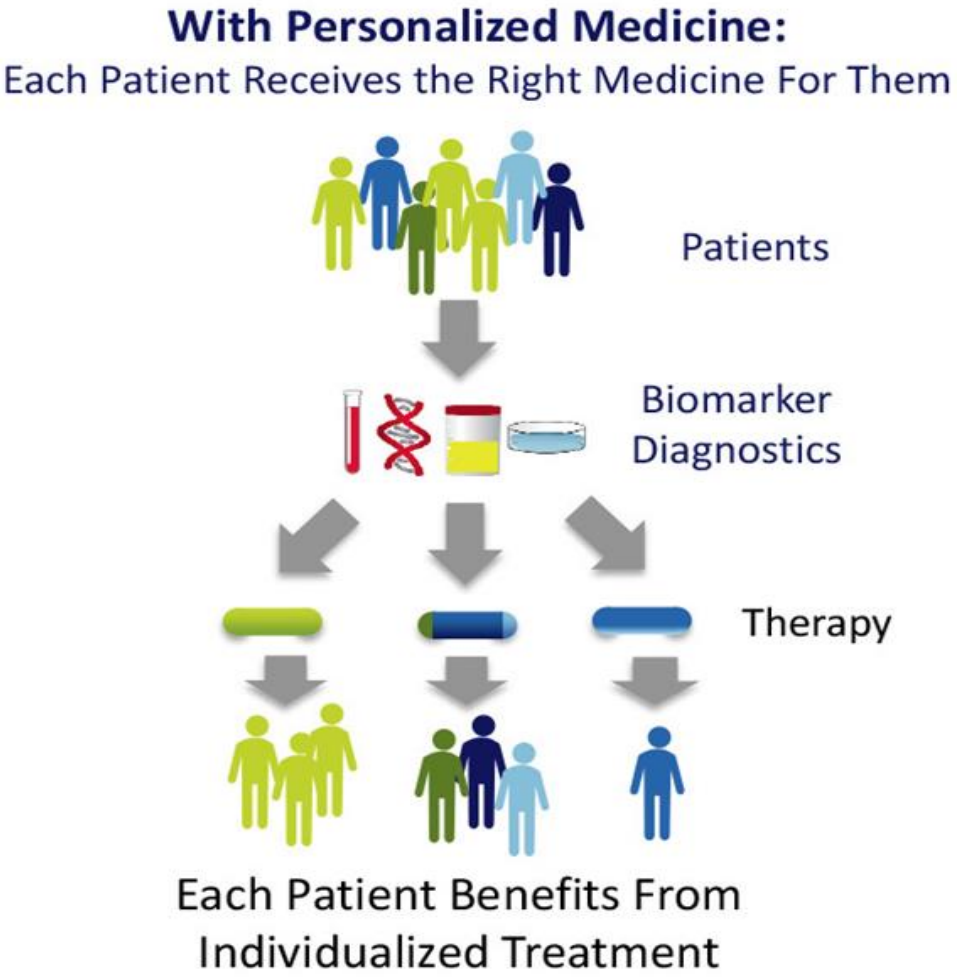
- **<u>for excluding patients at increased risk:</u>** serious adverse drug reactions (e.g. abacavir and *HLA B* 5701* or carbamazepine and *HLA-B*1502*)

- **<u>for prediction of drug response:</u>** high likelihood of experiencing benefit with a particular medicinal product with few or no safety issues/adverse events (trastuzumab in breast cancer with Her-2 overexpression).

Generalised vs personalised medicine

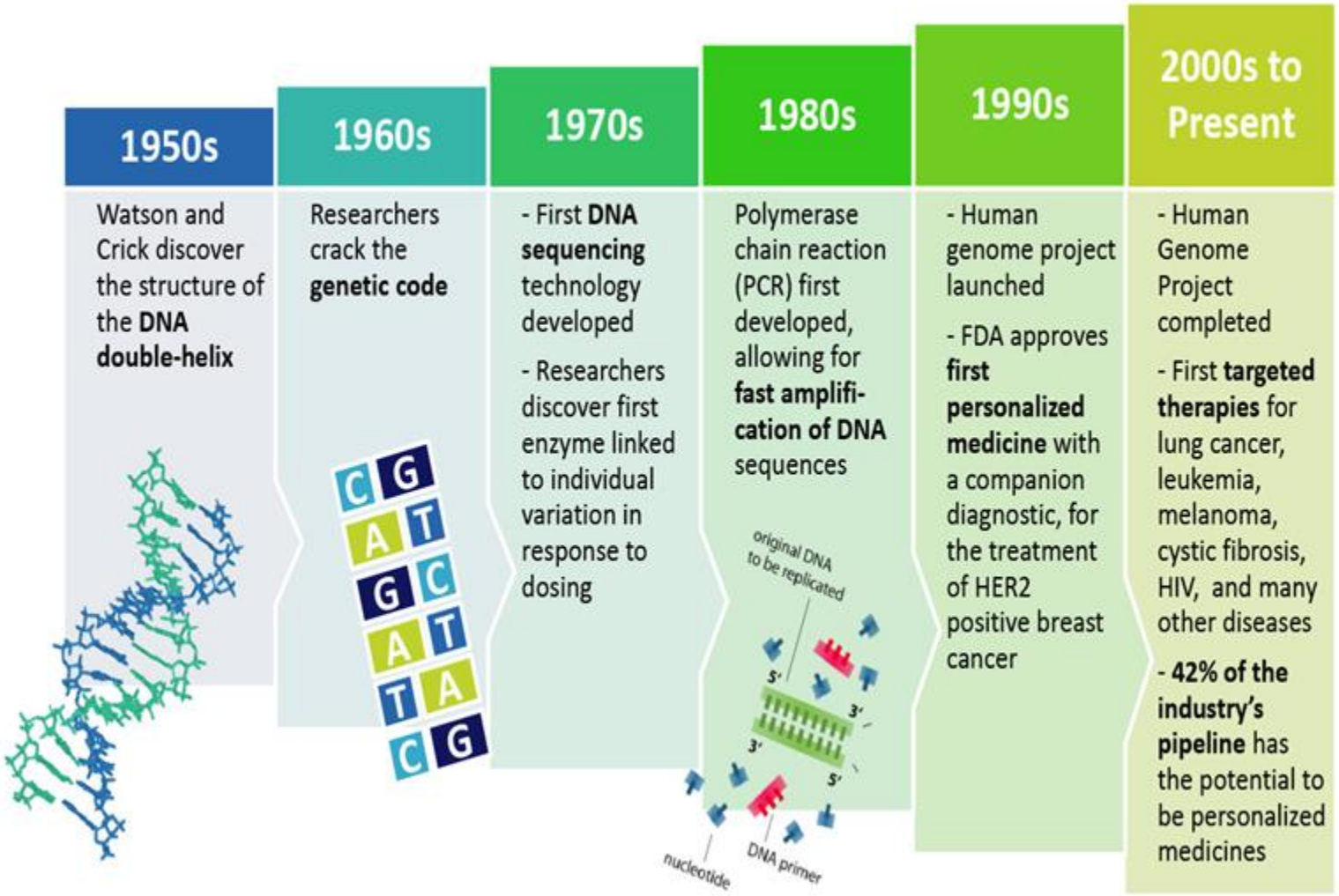


Source: http://genetictional.blogspot.com/2013_04_01_archive.html



Source: https://chartpack.phrma.org/personal-medicines-in-development-chartpack/a-new-treatment-paradigm/scientific-advances-fuel-personalized-medicine

The road to personalised medicine



Source: https://chartpack.phrma.org/personal-medicines-in-development-chartpack/a-new-treatment-paradigm/scientific-advances-fuel-personalized-medicine

Companion diagnostics (CDx)

- Personalised medicine: Co-development of diagnostics and targeted drug therapy
- optimized cost, time and success rate of pharma clinical trials
- narrowing clinical trial size

- Companion Diagnostics are tests that identify

  ->the most suitable patients for a particular treatment

  or

  ->patients with the greatest likelihood to respond to therapies before they are administered, narrowing trial sizes considerably.

Personalised medicine patents are "further medical use" patents that can be based on:

- new route of administration
- new dosage regimen
- new patient group
- new clinical situation
- new mechanism of action

Personalised medicine: patenting (1)

- Known drug
- Known treatment
- New selection of a subgroup of patients
- Based on (a) biomarker(s) such as:
  genotyping a SNP, gene expression profiles, methylation patterns...

➢ **Claims to SNPs, primers, probes, antibodies**

A nucleic acid comprising the sequence of SEQ ID NO: 1 (SNP) and having less than 500 nucleotides.

A primer according to SEQ ID NO: 2 (binding specifically to the SNP).

An antibody specifically recognizing the epitope with SEQ ID NO: 3.

Personalised medicine: patenting (2)

- **Claims to prediction / prognosis / diagnosis**

  Method of predicting whether a patient suffering from disease Y will respond to treatment with Compound X by determining the genetic marker Z.

  Method of diagnosing disease Y subtype Z by testing for the presence of the SNP having the sequence of SEQ ID NO: 4.

- **Further medical use claims directed to therapeutic use**

  Compound X for use in a method of treatment of disease Y characterised in that the patient has the genetic marker Z.

The effects of personalised medicine

On patients

- Greater likelihood of responding to therapy and confidence in response
- Improved safety and fewer side effects
- Improved quality of life and longer lifetime

On the healthcare system

- Optimal dosing
- Avoiding adverse effects
- It is quicker to find the right treatment or clinical trial
- More focus on prevention

On the pharma industry

- Optimized cost, time and success rate of pharma clinical trials
- Patents are cheaper to be obained
- Reduced competition in the generic market

Diagnostics and personalised medicine under the EPC

- EPC and Biodirective provide a comprehensive legal framework for **patenting biotechnological inventions**
- Nucleic acids (DNA, RNA), proteins, antibodies, viruses, cells **are patentable**, even if identical to naturally occurring substances, but a function has to be described
- Diagnostic methods using a “law of nature” are **patentable**
- Patient group selection can establish **novelty** of a further medical use claim

Questions?

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