

# Origin of Medicinal Substances

## 1. Herbal Medicinal Products

A herbal medicinal product (phytomedicine) is a pharmaceutical product whose active substance comes exclusively from one or more plants (leaves, flowers, roots, etc.). These plants have long been used for their therapeutic effects, such as willow (aspirin), valerian (calming agent), or passionflower (sleep aid). They are regulated by health authorities, such as the ANSM in France, to guarantee safety and efficacy, sometimes with traditional labeling.

### **Definition**

Plant-based active substance:

A compound extracted from one or more plants used for its therapeutic effect (e.g., echinacea, ginger).

### **Dosage forms:**

Traditional preparations (herbal teas, poultices) or modern ones (capsules, syrups).

Common Examples

- White Willow / Meadowsweet: Source of salicylates, precursors to aspirin, for pain and fever.
- Passionflower: Used for its calming effects and for sleep disorders.
- Valerian: Plant with sedative and relaxing properties.
- Ginger: For nausea and digestive problems.
- Artichoke (leaves): Liver and digestive support.
- Blackcurrant: For circulatory problems.

### **Regulatory Status**

- Marketing Authorization (MA): Required for marketing as a medicine in France.
- Traditional Indications: Some MAs are based on historical use ("traditionally used for...") due to a lack of comprehensive clinical trials, such as for mild anxiety or heavy legs.
- Distinction: Different from food supplements (such as some CBD products) which are not medicines.

Importance

- Source of modern medicines: Many chemical drugs are derived from plants (morphine, quinine).
- Therapeutic diversity: Used for a wide range of ailments: digestive, circulatory, nervous, etc.

### **Aromatherapy:**

Aromatherapy is a branch of herbal medicine that uses essential oils (concentrated plant extracts) to improve physical and mental well-being by acting on the body through

atmospheric diffusion, inhalation, diluted topical application (massage, bath), or, more rarely, orally. These oils, rich in active molecules, can have relaxing, anti-inflammatory, stimulating, or antiseptic properties, relieving everyday ailments (stress, sleep problems, pain) and strengthening the body's natural defenses, but they must be used with caution because they are potent.

### **How does it work?**

- Extraction: Essential oils are obtained by steam distillation or cold pressing (for citrus fruits).
- Active ingredients: They contain molecules such as menthol (peppermint), linalool (lavender), or eucalyptol (eucalyptus) which determine their effects.
- Methods of use:
  - o Diffusion: Into the air, to purify and soothe.
  - o Inhalation: Directly (handkerchief) or indirectly (bowl of hot water) for respiratory issues.
  - o Topical application: Diluted in a carrier oil for massages or compresses (pain, tension).
  - o Oral use: On a sugar cube or in capsules, under the supervision of a doctor or qualified aromatherapist.

### **Common Benefits**

- Stress and anxiety reduction.
- Improved sleep.
- Relief from muscle pain and headaches.
- Respiratory support (decongestant, expectorant).
- Immune system boost.

### **Important Precautions**

- Essential oils are highly concentrated and potent.
- Do not use without medical advice, especially for children, pregnant women, or breastfeeding mothers.
- Follow the dosage and application instructions.
- Choose high-quality products (botanically and biochemically defined).

## **2. Animal-Derived Drugs**

Animal-derived drugs use components from animals (cattle, pigs, horses, etc.) for substances such as heparin (an anticoagulant), pancreatic enzymes, hormones (insulin, estrogens), or tissues (heart valves, collagen) for implants and dressings, illustrating organotherapy (organ therapy), which is gradually replacing plant-based or synthetic sources.

### **Common Examples of Animal-Derived Drugs**

- Heparin: An anticoagulant derived from the intestinal mucosa of pigs or cattle.
- Enzymes: Pancreatic supplements (Creon, Viokace) for digestion, derived from the animal pancreas.
- Hormones: Insulins (porcine/bovine) and conjugated estrogens (Premarin).
- Implantable Materials: Collagen (bovine/porcine) for wall reinforcements, heart valves, and dressings.
- Hyaluronic acid: Extract of rooster combs for intraocular solutions.
- Other: Certain milk proteins (casein), beeswax, and propolis can be used.

### **Areas of application**

- Surgery: Hemostatic dressings, heart valves, tissue reinforcement.
- Internal medicine: Treatment of thrombosis (heparin), diabetes (insulin), digestive problems (enzymes).
- Ophthalmology: Viscoelastic solutions.

### **Developments**

- The therapeutic use of animals is ancient (animal therapy), but is now complemented by synthetic or plant-based alternatives.
- Companies are developing medications that are 100% free of animal-derived ingredients to meet ethical and religious demands.

#### **a. Organ-based drugs:**

Organ-based drugs are primarily immunosuppressants (such as tacrolimus - Prograf or Advagraf, mycophenolate mofetil - Cellcept, azathioprine - Imurel), used to prevent the body from rejecting a transplanted organ (kidney, liver, heart, etc.) because they suppress the immune system. There are also specialized solutions for organ preservation before transplantation, such as Celsior.

#### **Immunosuppressant drugs (post-transplantation):**

- Tacrolimus (Prograf, Advagraf, Envarsus, Modigraf): Prevents rejection of transplanted organs (kidney, liver, heart) by inhibiting the immune response.
  - Azathioprine (Imurel): Suppresses the body's defenses, used to prevent transplant rejection and treat certain autoimmune diseases.
- Mycophenolate mofetil (Cellcept): Also used to prevent rejection.
- Others: Everolimus (Certican), Sirolimus, Belatacept, etc.
- Organ preservation drugs:
- Celsior: A solution used to preserve thoracic (heart, lungs) and abdominal (kidneys, liver, pancreas) organs during harvesting, storage, and transport.

- Perisoc: Another solution for organ preservation, particularly for cardioplegia.

In summary, the term "organ-based drugs" refers either to therapies that act on organs (immunosuppressants) or to products that preserve organs for transplantation.