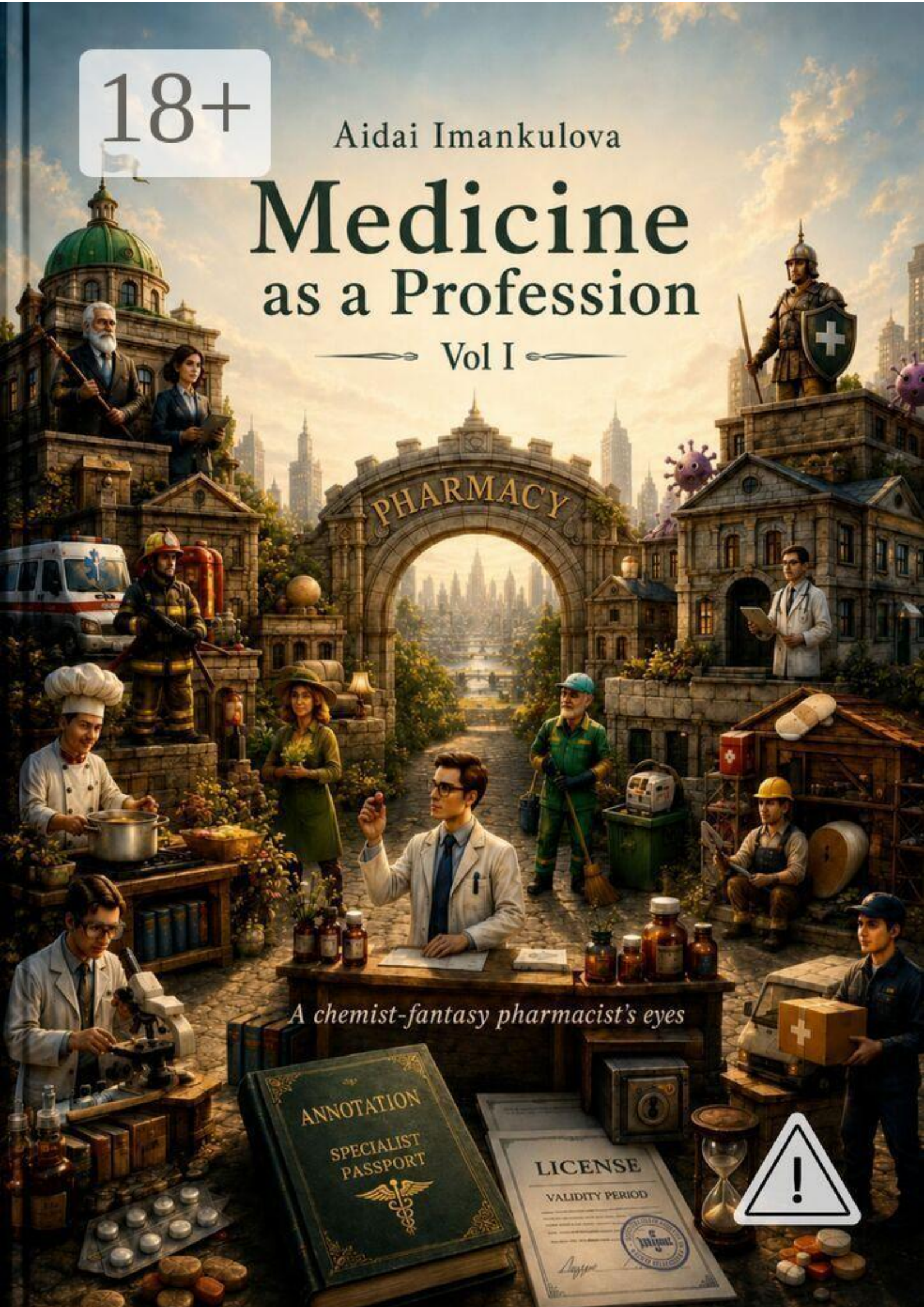


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Aidai Imankulova

Medicine as a Profession

Vol I



A chemist-fantasy pharmacist's eyes



Aidai Imankulova

**Medicine as a profession. Vol I.
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«Издательские решения»

Imankulova A.

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НЕЗАКОННОЕ ПОТРЕБЛЕНИЕ НАРКОТИЧЕСКИХ СРЕДСТВ,
ПСИХОТРОПНЫХ ВЕЩЕСТВ, ИХ АНАЛОГОВ ПРИЧИНЯЕТ
ВРЕД ЗДОРОВЬЮ, ИХ НЕЗАКОННЫЙ ОБОРОТ ЗАПРЕЩЕН
И ВЛЕЧЕТ УСТАНОВЛЕННУЮ ЗАКОНОДАТЕЛЬСТВОМ
ОТВЕТСТВЕННОСТЬ. Pharmacology is not a collection of boring formulas; it is
a true City of Professions right inside us. Every molecule here is a hired specialist
with its own job description. A standard antipyretic works as a rugged firefighter,
an antispasmodic serves as a locksmith for jammed pipes, and vaccines act as
professors at the military academy. This book explains in plain and simple terms
exactly WHO ordinary medications function as within the body.

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Medicine as a profession. Vol I

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Medical Disclaimer

The author kindly reminds readers that all materials presented in this book are created solely for educational, popular-science, and entertainment purposes. The professional metaphors described herein are intended to explain the underlying logic of molecular mechanisms but do not constitute a guide to action.

The governance of the Body-State, interpretation of symptoms, and treatment of any pathologies must be conducted strictly under the guidance of a qualified medical professional — your attending physician. Never engage in self-treatment, handle the ecology of your body with care, and always thoroughly double-check the original official instructions and physical labels of medications before use!

A Note to the Reader

Why Medicines Resemble People of Various Professions

Every time an ordinary person walks into a pharmacy, they see endless rows of boxes with hard-to-pronounce chemical names. For most, it is a dead, intimidating Latin and dull, grey instruction sheets. But to a chemist-fantasizer, a pharmacy is a vast, bustling, and densely populated megacity, where every molecule is a living specialist with its own unique character, educational background, and strict job descriptions.

Medicines are surprisingly like humans. They have a “primary profession” — the reason they are most frequently hired for a job (the main therapeutic effect). They possess “additional skills” (when they can temporarily step in for a colleague from another department). And, of course, they have their own “occupational hazards” (side effects). Just as a construction worker who is exhausted after a long day might accidentally step on someone’s foot, a potent medicine, while performing heavy labor, can slightly disrupt neighboring peaceful organs.

Understanding medicines through the world of professions is the only way to stop blindly memorizing commercial trademarks and begin to see the very core and beautiful logic of biological processes.

The Body as a State: Organs, Ministries, and System Crises

To understand how this city of professions is structured, let us imagine the human body as a sovereign, high-tech state. In this country, a strict hierarchy rules, where every system and every organ is a vital Ministry, agency, or emergency service:

- **Central Administration (Hypothalamus and Pituitary Gland):** The highest government executive. They meet in the most secure bunker of the brain, making strategic decisions and dispatching directives-hormones across the country. We will analyze the work of these top-ranking officials in detail in Chapter 3.

- **Ministry of Communications and Digital Development (The Nervous System):** It enmeshes the entire country with millions of kilometers of fiber-optic cables, instantly transmitting signals from the outskirts to the center.

- **Ministry of Energy (The Thyroid Gland):** A true thermal power plant in a single person, responsible for how brightly the lights burn in the regions, and how quickly cells consume fuel and generate heat.

- **Ministry of Defence and Border Control (The Immune System):** Patrols the borders of the State around the clock, tracking down virus-spies and ruthlessly destroying the fortified bases of bacterial invaders.

- **Ministry of Internal Affairs and Security (Allergy):** A special internal police force that occasionally lapses into paranoia and begins storming peaceful citizens (harmless flower pollen or ripe strawberries), causing senseless havoc on the streets.

- **Public Utilities and Environmental Oversight (The GI Tract and Kidneys):** The main water treatment plants, garbage trucks, and chemical complexes of the country. They dispose of tons of waste, process raw materials, and monitor the cleanliness of internal rivers — blood and lymph.

- **Transport and Hydraulics (The Cardiovascular System):** A highly complex network of roads, overpasses, and pipelines, along which logistical trains run continuously, delivering oxygen to the most remote provinces of the organism.

When a person is healthy, all Ministries work like clockwork. But illness is always a disruption of the usual rhythm, a specific system crisis: a fire, an accident at the water utility, a traffic collapse, an economic downturn, or an internal rebellion. And at this exact moment, they step onto the stage — the

professionals from the pharmacy packages. Some will arrive as crisis managers, some as emergency firefighters, and others as clever and subtle diplomats.

What is Your Medicine's Job?

Pharmacology often seems like an impregnable fortress. It is barricaded behind thousands of complex names, Latin terms, and endless commercial trademarks. Medical and pharmacy students spend sleepless nights trying to memorize these lists, while novice pharmacists at the counter initially get lost in the sheer volume of brands on the shelves. But in reality, everything is much easier, more logical, and more interesting than what is written in academic textbooks.

By education, I am a chemist. I graduated from the Mendeleev University of Chemical Technology in Moscow. At the time, a rigorous, foundational chemistry education trained my brain to handle colossal amounts of information. We memorized tons of massive encyclopedic formulas, complex reaction mechanisms, and endless classifications of alcohols, acids, complex salts, and polymers.

When, after such training, I came to work in a retail pharmacy, pharmacology seemed even simpler in comparison. Here, you didn't have to assemble molecules from scratch — you just needed to understand the logic of distributing drugs among professional guilds (pharmacological groups). Thanks to this system, I managed to fully master a huge pharmacy matrix in just one month, flipping through reference books in a Moscow metro car on my way to work.

But by no means does everyone have a foundational specialized education. For most people, all these dry Latin classifications are a true nightmare. That is exactly why I decided to write this book. I want to completely remove complex formulas, heavy terms, and academic unwieldiness from the text. Instead, I suggest turning on your imagination, utilizing figurative thinking, and translating the complex scientific language into the understandable language of everyday life.

After all, every molecule, just like a real employee, possesses:

- Its primary profession (the main therapeutic effect);
- Additional skills (secondary effects);
- Working tools (the molecular mechanism of action);
- A workplace (a specific receptor, enzyme, or tissue);
- Hiring regulations (indications for use);
- Occupational hazards and restrictions (side effects and contraindications);
- An arrival route to the site (the route of administration and pharmacokinetics).

When a fire of inflammation breaks out in the State, brave firefighters — NSAIDs — rush to the call. If pipes burst and the country is flooding, the emergency water utility service — diuretics — takes over. When blind gridlocks form on the roads-vessels, the situation is saved by specialized equipment — anticoagulants. And if the cells of the State are locked and starving while the food warehouses are full, the treasurer-insulin comes to the rescue — the chief keymaster of the energy system, who holds the code to any locked door.

A Translator Book

I want to emphasize a crucial point. What lies before you is not just a collection of artistic inventions for the sake of a beautiful word. Every analogy in this book is strictly verified. It is built upon real biochemistry, physiology, and the unshakeable principles of evidence-based medicine. The images of professions are needed to unlock your intuition and logic without blind memorization. This book does not replace a classic pharmacology textbook. It becomes its translator — a reliable bridge between dry science and living human perception.

Memorizing a complex chemical formula or an abstract commercial brand name is difficult. Memorizing the profession, position, and area of responsibility of a molecule is as easy as pie.

Before you is the First Book of a large diptych: "Medicine as a Profession." In it, we will figure out exactly what jobs medicines do. We will enter the Body-State and get to know those who save it from catastrophes every single day.

As for the history behind each specialist, the long journey they had to take from an idea to the pharmacy shelf, and the dramas of harsh trials they had to break through — we will remain silent for now. Let that remain an intrigue for the Second Book, “The Fate of a Medicine.” In the meantime, let us open the doors of this amazing pharmacy together!

Chapter 1. The Golden Rule of Pharmacology, or How Molecules Get Hired

When you open a box of pills, you see more than just compressed white powder. You are holding the resume of a highly qualified specialist who has arrived in the Body-State under an urgent contract. To understand how pharmacology works, you need to grasp its golden rule: a medicine behaves inside the organism in exactly the same way a person behaves at their job. It has its own responsibilities, professional habits, corporate conflicts, and even inevitable production overheads.

Primary and Additional Professions: A Jack-of-All-Trades

In academic textbooks, this is dully referred to as “the primary therapeutic and secondary pharmacological effects.” In our universe, however, every molecule has a main specialty for which it is hired most often, and a whole bundle of extra talents.

Imagine a popular and highly experienced employee named Aspirin. His primary profession is a Firefighter. When an emergency strikes the State, and the flames of high fever and inflammation rage, Aspirin promptly arrives at the scene and puts out the fire. However, he has an excellent additional skill that he has mastered to perfection — he knows how to moonshine as a Traffic Controller, preventing platelet-cells from sticking together into dangerous gridlocks. At some point, the State's Ministry of Health decided that this side skill of his was even more valuable than the main one. As a result, Aspirin in low dosages (cardio forms) began to be hired full-time exclusively as a traffic inspector for the prevention of heart attacks, almost forgetting his firefighting past.

Specialist Profile

- Pharmacological Group Name: Nonsteroidal anti-inflammatory drugs (NSAIDs), antiplatelet agents.
- Site of Service in the Organism: Foci of inflammation (any tissues) and major blood vessels.
- Working Tool (Physiological Mechanism): Irreversible blockade of cyclooxygenase enzymes (COX-1 and COX-2). In the role of a Firefighter, Aspirin halts the synthesis of prostaglandins — the main chemical “alarm sirens” that cause swelling, pain, and fever. In the role of a Traffic Controller, he permanently blocks the synthesis of thromboxane A₂ in platelets. The cell loses its ability to secrete sticky protein and can no longer grip tightly to its neighbors, maintaining ideal blood fluidity on the road-vessels.
- Side Effects: Aggressive erosion of the protective stomach mucus, triggering hidden bleeding (“excessive thinning”), specific bronchospasms (“aspirin-induced asthma”).
- Affected Organs (Risks): Gastrointestinal tract, kidney filters, respiratory tract.
- Hiring Requirements (Indications): Prevention of thrombosis and ischemic catastrophes (for low doses), management of acute pain syndrome, fever during infectious fires.
- Strict Contraindications: Erosions and ulcers of the GI tract in the acute phase, hemophilia and a tendency to bleed, third trimester of pregnancy, children under 12 years of age (risk of severe liver damage — Reye's syndrome).
- Logistics and Transport (Dosage Forms): Standard and effervescent (soluble) tablets, enteric-coated tablets (to reduce stomach harm). Absorbed in the GI tract, works systemically throughout the body.
- Delivery Speed: Standard passenger train. Action begins in 20—30 minutes, peak concentration at the site is reached in 1—2 hours.

It also happens that an additional skill completely overshadows the main specialty, forcing a molecule to change its role forever. Sildenafil was originally hired for a prestigious position as a Hydraulic Engineer to improve blood flow in the major vessels of the heart. But during his test run, it turned out that he had a phenomenal side talent — he perfectly directed targeted hydraulic pressure to

the pelvic organs. In the end, Sildenafil quit cardiology entirely, took the resonant pseudonym Viagra, and became the world's highest-paid specialist in a completely different, intimate sphere.

Specialist Profile

- Pharmacological Group Name: Agents for the treatment of erectile dysfunction, PDE-5 inhibitors.

- Site of Service in the Organism: Smooth muscle structures of the pelvic vessels (highways of targeted pressure distribution).

- Working Tool (Physiological Mechanism): Selective blockade of the phosphodiesterase type 5 (PDE-5) enzyme. Normally, this enzyme works like a “shut-off valve” that quickly cuts off the inflow of hydraulic fluid (blood) after a task is completed. By blocking this valve, Sildenafil allows cyclic guanosine monophosphate (cGMP) to accumulate. The vessels remain maximally dilated, ensuring a powerful and stable influx of blood to the site.

- Side Effects: Sudden rushes of blood to the face and heat, nasal congestion, moderate headache, short-term changes in color perception (the world around may turn blue).

- Affected Organs (Risks): Vascular system of the brain and face, visual analyzer.

- Hiring Requirements (Indications): Erectile dysfunction of various origins, pulmonary hypertension.

- Strict Contraindications: Concurrent use of nitric oxide donors or nitrates (risk of a fatal drop in pressure inside the pipes), severe heart failure, recently suffered heart attack or stroke.

- Logistics and Transport (Dosage Forms): Oral coated tablets. Absorbed in the intestine, requires a preliminary light diet (fatty food blocks molecules from boarding the train).

- Delivery Speed: Express train. Appears at the site in 30—60 minutes, the contract remains valid for 4—5 hours.

Side Effects: Production Noise and Accidental Damage to Neighbors

The medical community and patients often study the long list of side effects in the instruction leaflet with anxiety. But let's be honest: perfect workers do not exist. Any serious activity leaves traces, and any complex job has its overheads. Side effects of medicines are not the molecule's mistake. They are the production noise of its profession, or the result of its powerful working tools accidentally brushing against adjacent departments of the State. A specialist arrives, honestly performs their main function, but along the way, they might spill, flood, or scratch something else.

Imagine a brave brigade of firefighters — the NSAID group (for instance, Ibuprofen). They are called out when a furious fire of pain and inflammation breaks out in a joint within the organism. The firefighters act professionally: they shut off the chemical valves (COX enzymes) that feed the fire. But the trouble is that the foam they use to extinguish the flames inevitably flows down the pipes. It floods and erodes the thin protective layer on the stomach walls, because those very same valves in peacetime were responsible for producing protective mucus. The fire in the joint is successfully put out, but a breach — an ulcer — has now formed in the digestion department because of this foam. The firefighter did not want to harm the stomach; his equipment simply comes with such operational overheads.

Specialist Profile

- Pharmacological Group Name: Nonsteroidal anti-inflammatory drugs (NSAIDs).

- Site of Service in the Organism: Foci of tissue damage, joints, central thermoregulatory nodes of the brain.

- Working Tool (Physiological Mechanism): Reversible blockade of COX-1 and COX-2 enzymes. By blocking COX-2, Ibuprofen promptly extinguishes the focus of inflammation, soothes pain, and commands the hypothalamus to reduce the temperature. But simultaneously, the blocked COX-1 stops the synthesis of prostaglandins in the stomach walls. Because of this, the production of protective mucus and bicarbonates drops, and the stomach's own native acid begins to digest its own walls.

- Side Effects: Heartburn, nausea, ulceration of the GI mucous membranes, fluid retention in peripheral regions (swelling), increased pressure in the vessel-pipes.
- Affected Organs (Risks): Stomach, duodenum, kidneys.
- Hiring Requirements (Indications): Acute joint and muscle pain, headaches and toothaches, feverish states during cold-related accidents.
- Strict Contraindications: Peptic ulcer disease in the acute phase, severe renal or heart failure, last trimester of pregnancy.
- Logistics and Transport (Dosage Forms): Tablets, liquid-center capsules (accelerated boarding), suspensions (children's squad), gels for external border repairs.
- Delivery Speed: Fast freight train. When taken orally, it begins to work in 30—40 minutes, holding positions for up to 4—6 hours.

And now let's take a look at the Ministry of Defence and the Border Control service, where the rugged military special forces serve — antibiotics. They are hired when dangerous armed gangs — pathogenic bacteria — break into the State. Antibiotics enter the site with no compromises. They act tough, opening fire to kill: they blow up the cell walls of the invaders or permanently break their internal machinery for assembling proteins. But in the process of this special operation, they cannot work with surgical precision. Their heavy artillery inevitably hits peaceful citizens — the beneficial microflora of the Intestine, which has no protection against military-grade weapons. The special forces liquidated the invaders and saved the State from doom, but the local digestive infrastructure is temporarily destroyed, and a communal chaos (dysbacteriosis) begins in the department. That is exactly why, when hiring a serious specialist, we must always be prepared to do a little “cleaning up” after them.

Pharmacological Groups as Professional Guilds, or Why We Don't Get Haircuts from Taxi Drivers

In our everyday life, we clearly separate specialists by their professional skills. If a pipe leaks in your apartment, you call a plumber, not a head chef from a restaurant. When you need a fashionable haircut, you go to a barber, not a taxi driver. You look for a highly targeted master for a specific task.

The exact same rule applies in the universe of the Body-State. If acute poisoning occurs at a chemical plant, the Cabinet of Ministers will not send Vitamins (who work more like gentle coaches for personal growth and spiritual strengthening) or Sleeping Pills (whose task is simply to turn off the lights in the Ministry of Communications on time). In case of poisoning, the State calls upon rugged, professional Sorbents — an emergency response cleaning service that physically binds, packs into bags, and carries all toxic waste off the territory.

That is exactly why all pharmaceutical drugs in a massive pharmacy matrix are strictly divided into pharmacological groups. A pharmacological group is a professional guild, a workshop of narrow-profile specialists. Each such guild has its own specialization (they can only do one specific job and do not meddle in other people's business) and its own strict place of work (a specific organ, tissue, or a tiny molecular machine-receptor).

Therefore, when critical pressure rises in the transport system (vessels), the guild of Antihypertensive drugs is dispatched to the call. Within this guild, there are different masters: some loosen the nuts on the vessel-pipes, some pump out excess water, but all of them work toward one goal — to save the roads from bursting. And they will never go to war with bacteria, because there is a completely different trade union for that — antibiotics. By understanding which “guild” a molecule belongs to, you instantly understand which site it will arrive at and what problem it will rush to solve.

The Course of Treatment as an Employment Contract and Tutor Sessions

When a doctor writes you a prescription, you act as an employer signing an official labor agreement (contract) with the medicine. This document strictly dictates three things: the volume of work (dosage), the shift schedule (frequency of intake), and the duration of service (course of treatment).

In our lives, we constantly encounter contract systems. If you need to brush up on your English, you understand that a single session with a tutor will yield no results. You hire a teacher for six months and study with strict regularity — for instance, twice a week. If you want to fix your posture, you don't expect a miracle from a single visit to a massage therapist; instead, you buy a package for a course of ten sessions. A cosmetologist, a gym trainer, a car mechanic — they all work in sessions and courses, because only a systematic approach yields a cumulative and lasting effect.

In the Body-State, this law of discipline applies even more strictly. You cannot just call a specialist once so they can “stand in the room.” Each molecule is hired for a strictly defined volume of work. Based on duration, these contracts come in three types:

1. A short-term contract for a single task (Freelance). This includes, for example, the antipyretic Paracetamol or the pain reliever Ibuprofen. These are classic freelancers. An emergency occurred — a fire of high temperature. You call a specialist, he promptly puts out the flames, receives his “fee” (gets metabolized), leaves the body, and the contract is closed. If there is no fire tomorrow, no one calls Paracetamol back to work.

2. A strict fixed-term contract (Session work). The most vivid example is antibiotics. They are hired as a rugged military contingent strictly for a specific term: for example, taking pills twice a day — morning and evening — for 7 days. A clear shift schedule is written into the contract so that an armed patrol is constantly on duty in the State. If a patient stops taking pills on the third day because “I already feel better,” they commit an occupational crime. They prematurely and unilaterally breach the contract, firing an army of mercenaries right in the middle of a battle. The bacteria immediately stage a mutiny, seize new departments, and mutate, developing a defense against this weapon.

3. A lifelong contract (Permanent staff). Some molecules get a job in the State forever. These are drugs for chronic high blood pressure or diabetes. They become permanent, irreplaceable employees who — every single day, without weekends, vacations, or lunch breaks — maintain order in the transport or energy system of the body. Firing them means instantly returning the system to a state of chaos.

Therefore, when opening a pack of pills, remember: you are hiring a professional. And if their “labor agreement” says to arrive at the site twice a day for a week, ensure they have this access. The employer's discipline is the sole guarantee of the entire operation's success.

Chapter 2. Logistics and Supply

- Pharmacological Group Name: Delivery vehicles of medicinal substances.
- Profession in the Metaphor: Chiefs of logistical hubs, dispatchers of vehicle fleets, airborne drop platforms, and capsules for ultra-fast delivery.
- Site of Service in the Organism: Respiratory system, gastrointestinal tract, major blood highways, and cutaneous borders.

Job Description of the Specialist

The primary responsibility of any logistical service in the Body-State is to deliver the right specialist (molecule) to the site with maximum speed and minimal losses along the way.

In classic logistics, medicine is most frequently sent by a standard passenger train through the gastrointestinal tract. However, a rugged customs checkpoint awaits it there — the Liver, the main chemical plant of the country. Pharmacists call this the first-pass effect through the liver. The local customs enzyme-officers do not care about the good intentions of the guest: they perceive any foreign molecule as a potential saboteur and mercilessly send up to 50—90% of the useful cargo to the recycling press.

The percentage of the personnel that survives the harsh inspection and breaks through into the major bloodstream is called bioavailability. The logistical service is obligated to thoroughly know all the shortcut paths of the State, be able to convert molecules into the required states of matter, and flawlessly select transport platforms to deliver aid on time and without losses, bypassing the liver cordons.

Local and Systemic Action: The Scale of Special Operations

Logisticians strictly divide operations by the scale of their impact into two types: regional repair brigades and general state mobilization.

1. Local Action — Targeted Repairs on Site

This means providing aid strictly at the crash site, without involving the resources of the entire country. The specialist arrives covertly at the scene, does their job, and does not go out onto the central highways. Neighboring Ministries do not even suspect that any work is being done.

- The Ointment Example: If a worker at a construction site damages a knee, we apply a pain-relieving ointment directly to the skin over the joint. The molecules penetrate through the border tissues and work locally. They do not wander through the entire body, do not fly into the kidneys or stomach, and do not cause any production noise there.

- The Inhaler Example: When a person suffers a bronchospasm, a pocket inhaler delivers a dilating molecule directly through the airways into the lungs. The specialist expands the pipes on site, saving the person from suffocation, but barely enters the general bloodstream, thanks to which the heart does not begin to pound furiously.

2. Systemic Action — Mobilization of the Entire State

This is a large-scale operation where a molecule is required to dissolve into the general transport flow (blood), spread across all roads, and reach every single living cell, including the Central Administration.

- The Inhalation Anesthesia Example: The patient simply breathes gas through a mask, but this gas possesses a powerful systemic action. The massive surface area of the alveoli allows the molecules to be absorbed into the blood instantly. With the blood flow, they fly up to the Central Administration (the brain), turn off consciousness, and plunge absolutely all Ministries into a therapeutic sleep.

- The Tablets and Injections Example: Any routine blood pressure pill or antibiotic injection always works systemically. They circulate throughout the entire circulatory system, affecting the general economy and vital activity of the country.

Delivery Speed and Duration of Action

In logistics, time is life. A molecule's work is evaluated by two parameters: how quickly the specialist reaches the site (delivery speed) and how long they can hold the defensive line (duration of action).

1. Delivery Speed: Express Draisines vs. Freight Trains

- **Supersonic Express (Sublingual Nitroglycerin):** When the heart is squeezed (an angina attack), there is no time for an oral train — the engine might stop in a couple of minutes. The patient places a Nitroglycerin tablet under the tongue. Here, beneath the thin mucous membrane, runs a direct high-speed subway line that completely bypasses the liver customs. The molecule is absorbed in 1—2 minutes and instantly reaches the heart vessels, lifting the blockade.

- **Heavy Freight Train (Standard Tablets):** Most routine specialists are slow to get moving. They need to travel to the stomach, dissolve, be absorbed in the intestine, and pass inspection at the liver customs. This entire journey takes anywhere from 30 to 60 minutes. Such transport is categorically unsuited for extinguishing emergency catastrophes.

2. Duration of Action: Short Shifts vs. Around-the-Clock Garrisons

As soon as a molecule arrives at its workplace, the internal environmental services (the liver and kidneys) immediately begin an operation to deport it from the country (half-life):

- **Short-Shift Specialists (Benzylpenicillin):** This distinguished military antibiotic is an excellent combatant, but it has a catastrophically short shift. Literally 3—4 hours after an injection, the kidneys completely flush it out of the organism. If the patient forgets to dispatch a new squad to the site on time, a hole opens up on the frontline, and the bacteria immediately launch a counterattack. This is exactly why penicillin is injected in hospitals strictly every 4—6 hours, even at night.

- **Around-the-Clock Garrisons (Azithromycin):** A modern heavy paratrooper. Upon entering the organism, it does not just float in the blood — it boards military macrophage-cells and rides with them directly into the focus of infection. There, it builds a fortified base and slowly, methodically destroys the enemy. Its work shift lasts more than 24 hours, and its accumulated resources are enough to last another week after the course ends. Therefore, it is hired for just one shift a day (1 tablet every 24 hours), and the entire contract lasts only 3 days.

Dosage Forms: The Vehicle Fleet and Special Transport of Molecules

For a specialist to successfully reach their workplace, it is not enough to issue them a job description — they must be placed into the right transport vehicle. Pharmacists call these machines dosage forms.

1. Solid Transport: Tablets and Capsules (Passenger Trains)

This is the most common and familiar type of transport. Molecules are packed into tight “train cars” and set off on their journey through the main station — the oral cavity.

- **Tablets** are standard open commuter trains. Upon entering the stomach, they fall apart under the action of the local acid, dropping passengers right onto the GI tract platform.

- **Capsules** are premium executive trains. Molecules sit inside a protective “armor” (a gelatin shell). This is necessary either to protect a delicate medicine from the aggressive stomach juices or, conversely, to shield the stomach itself from the harsh nature of the specialist. Such a train opens its doors later, strictly in a designated region — for example, in the small intestine.

2. Liquid Transport: Solutions for Injections and IVs (Special Forces Armored Vans)

When a red alert level is declared in the State and there is no time for trains, logisticians call in armored vehicles. The medicine is converted into an ideally clean liquid form and breaks through to the site through special airlocks (injections).

- **Intramuscular injections** are like deploying troops into a tent camp (a muscle depot). Molecules group together in the tissues and, from there, gradually leak in steady squads into the nearest capillary roads.

- Intravenous injections and IV drips are an instantaneous teleport. Bypassing absolutely all stations, traffic lights, and liver customs, one hundred percent of the personnel is thrown directly onto the central high-speed highway of the State (into the bloodstream) for immediate systemic action.

3. Soft and External Transport: Ointments, Gels, and Patches (Border Couriers)

Sometimes a problem needs to be solved at the farthest outskirts. Driving special forces down central roads for this makes no sense.

- Ointments and gels are local repair brigades. They are applied directly to the external border and work superficially. Dense, greasy ointments sit on the site for a long time, creating a protective layer, while light, water-based gels are absorbed instantly, delivering molecules slightly deeper to the capillaries.

- Transdermal patches are clever smugglers. They stick to the skin and, for hours (or even days), smuggle molecules across the border in tiny, unnoticed portions directly into the subcutaneous vessels, ensuring stable systemic action without unnecessary injections.

4. Gaseous Transport: Aerosols and Inhalations (Airborne Assault)

- Working Tool: Inhalers and nebulizers (delivery capsules and drop platforms).

- Main Target on Site: Deep provinces of the lungs (alveoli), requiring a particle caliber strictly between 1 and 5 microns. Anything larger gets stuck in the throat, and anything smaller is exhaled right back out.

Occupational Risks of the Express Delivery Service

Even the most ideal airborne drop has its overheads. A portion of the squad inevitably settles along the route — on the walls of the oropharynx. If we are delivering, for instance, hormonal inspectors (glucocorticoids), they locally reduce the immune defense at the landing site. Without proper hygiene (mandatory rinsing of the mouth), “illegal migrants” (candidiasis) can run rampant there, causing hoarseness of the voice.

Hiring Requirements

- Indications: Need for emergency resuscitation, spasm of transport routes (bronchial asthma, COPD), surgical operations (inhalation anesthesia), or local treatment of damaged areas.

- Contraindications: Severe pulmonary or local bleeding in the administration zone, individual intolerance to the carrier gases or components of the transport capsule, as well as the patient's technical inability to perform a synchronized inhalation.

Main Idea of the Chapter

Logistics and supply teach us the main point: it is not enough to have a talented molecule; you must know how to properly calculate its route. The choice between a tablet, ointment, injection, or inhalation is not just a matter of convenience. It is a strategic decision on whether the specialist will go to restore order locally in one specific department or will launch a systemic operation across the entire country, risking production noise in neighboring regions.

Chapter 3. The State Governance of the Organism

In any developed state, orders from the White House reach local operators in two ways. The first is via urgent, lightning-fast government telegrams. They fly along the secure fiber-optic cables of the Nervous System in the form of electrical impulses, demanding an instantaneous reaction here and now.

The second path is followed by official Presidential decrees, printed in state newspapers and delivered via paper mail to all regions. They move without haste, but their influence is fundamental and their impact is long-term. In the human body, the role of these official state decrees is performed by hormones.

Hormones are the ministers, high-ranking officials, and special envoys of the supreme state power. They do not need to run and trip over nerve-fiber cables. With aristocratic composure, they properly enter the general transport stream — the bloodstream — and sail across the entire country, visiting the most remote provinces. However, not just any passerby can read their decree. Locally — within tissues, cells, and organs — their circulars are awaited by special secret departments called receptors. Only a cell that possesses the required receptor-key at its security checkpoint has the right to open the sealed envelope containing the hormonal decree, review its text, and unquestioningly begin executing the directive.

At the very center of governance, deep within the secure brain bunker, sits the country's supreme leadership — the inseparable duo of the Hypothalamus and the Pituitary Gland.

The Hypothalamus is the *éminence grise*, the intelligence chief, and the head of the Security Council all rolled into one. It works around the clock, with no breaks or weekends, gathering analytical reports from all corners of the state: what is the radiation and thermal temperature in the regions, how much gold and foreign exchange reserves (sugar) are left in the blood, and have any external enemies attacked?

The Pituitary Gland is the loyal Prime Minister. He does not travel to plants, mines, or factories himself, and he does not get his hands dirty with grease. Yet, it is he who, based on the Security Council's reports, issues "tropic hormones" — strict government directives for subordinate Ministries. His orders sound formidable: "To the Ministry of Energy (the thyroid): immediately increase heating in freezing regions! To the Department of Demography: start the production conveyor belts! To the adrenal glands: declare a state of combat readiness, prepare for assault!"

When a global systemic failure occurs within the operations of these ministries or the state economy, the internal strength of the officials is no longer enough. The system begins to fall apart. It is at this moment that independent, highly specialized experts from the outside — medications — are called upon to aid the exhausted State.

1. Crisis Managers of the Department of the Economy

Glucose is the primary national currency and the key gold-mining resource of our state. Without this energy injection, all cell-factories immediately grind to a halt, production freezes, and the lights go out. However, these financial flows cannot simply wander the streets in millions of editions unsupervised. If too much currency accumulates in the blood and it is left uncontrolled, the state descends into economic chaos, total inflation, and the destruction of vessel-streets — a severe systemic catastrophe known as diabetes mellitus.

To prevent this, the Minister of Finance — Insulin — labors in the Organism around the clock. His direct job responsibility is to collect excess glucose from the blood, distribute it to the secure underground vaults of muscle and adipose tissue, and send the strategic reserve to be stored in the state liver reserves.

But what should be done if a collapse occurs within the System? Sometimes Insulin simply goes on strike and ceases to be produced (Type 1 diabetes). Far more frequently, however, the cell-

factories completely lock their gates due to years of stress and overload, post guards, and flatly refuse to listen to their own minister of finance. Insulin knocks on their doors, but his keys no longer fit the receptor-locks. This economic blockade is called tissue insulin resistance (Type 2 diabetes). The glucose-currency piles up on the vessel-streets, eroding the road walls, while the factories inside starve without energy. The economy collapses. At this critical juncture, strict external administrators — glucose-lowering drugs — arrive at the facility.

Metformin enters the city like a stern Crisis Manager equipped with a search warrant and emergency powers. He has no intention of persuading lazy cell-factories to open their gates. Metformin penetrates inside and activates a secret internal lever — the intracellular enzyme AMPK (AMP-activated protein kinase). This lever literally cuts the rusted locks off the cell doors, forces them open, and sharply increases their sensitivity to Insulin's commands. The cells finally begin accepting the currency.

Yet Metformin does not stop there. He heads to the liver chemical plant, where local management is panicking and attempting to print new volumes of glucose, believing the country is facing a deficit. Metformin tightly shuts off these valves, blocking the excessive release of unrefined currency. This specialist deploys his audit program methodically and gradually — maximum control over the financial system is established after several days of a scheduled course of oral tablet intake.

Would you like to continue translating the next paragraph about sulfonylureas (debt collectors), or should we review the terminology for this section first?

2. Debt Collectors of the Ministry of Finance

If the situation requires more radical measures, sulfonylurea drugs begin working alongside him. These specialists act as ruthless debt collectors. They do not bother visiting the cells; instead, they burst straight into the private office of the exhausted minister, Insulin — specifically, into the beta cells of the pancreas.

The collectors tightly block the ATP-dependent potassium channels on the cell membranes. This shuts down the organ's internal ventilation, creates a powerful electrical shift, and forces the pancreas to work three shifts straight. It literally squeezes out and deploys massive new volumes of the hormone into the bloodstream to break through the factories' blockade.

Professional Risks:

Introducing such authoritarian external administrators always carries serious side effects for the infrastructure. While restoring order, Metformin enforces a harsh reorganization of sugar logistics within the intestines. This triggers an immediate rebellion from the local microflora, resulting in strikes, abdominal cramps, diarrhea, and a persistent metallic taste at the mouth-customs.

At the same time, insulin stimulants (sulfonylureas) can overstep their boundaries and drive the minister to such an extreme that, in a frenzy, he clears out absolutely all currency from the blood down to the very last cent. The State is left without a single penny, and the brain is deprived of its energy rations. This instantly cuts power to Central Administration, leads to critical hypoglycemia, and plunges the city into a state of severe hypoglycemic coma.

This is precisely why these specialists are strictly banned from approaching the facility during pregnancy, in cases of diabetic ketoacidosis, or when the state's sewage treatment facilities — severe renal failure — break down. If the kidneys cannot flush these harsh inspectors out of the city in time, they will accumulate and cause a dangerous toxic condition known as lactic acidosis.

Specialist Profile

- Name of the Pharmacological Group: Oral hypoglycemic (glucose-lowering) agents.
- Place of Service in the Organism: Muscle and adipose tissue cells, the liver, and beta cells of the pancreas.
- Working Tool (Mechanism): Metformin activates the enzyme AMPK (AMP-activated protein kinase). Sulfonylurea drugs block ATP-dependent potassium channels on the beta-cell membrane.

- Side Effects: Diarrhea, abdominal cramps, and a metallic taste in the mouth (for Metformin); a critical drop in glucose levels — hypoglycemia (for sulfonylurea drugs).

- Affected Organs (Risks): The gastrointestinal tract and the brain (in the event of a hypoglycemic coma).

- Conditions of Admission (Indications): Type 2 diabetes mellitus, metabolic syndrome, and tissue insulin resistance.

- Categorical Contraindications: Severe renal failure (the sewage systems will become clogged with the medication), diabetic ketoacidosis, and pregnancy.

- Site Restrictions: Metformin requires mandatory emergency suspension before the administration of radiopaque contrast agents (due to the risk of developing lactic acidosis).

- Transport and Logistics (Dosage Forms): Tablets (standard and extended-release). The route of administration is strictly oral (by mouth).

- Delivery Speed: Average deployment speed. Metformin rolls out its crisis management program gradually, with maximum audit control established after several days of a scheduled course.

2. Understudies and Saboteurs of the Ministry of Energy

The thyroid gland is the state's primary thermal power plant (TPP) and the Ministry of Energy all rolled into one. Its hormones determine the cosmic speed at which the Body-State must burn its internal resources during the basal metabolic process. This department decides exactly how much coal to toss into the furnace to warm the regions, spin the muscle turbines, and keep the gears of the brain turning at the required RPM.

But what happens if an accident occurs at the TPP and the Ministry retreats into a deep, forced energy-saving mode? This catastrophe is known as hypothyroidism. A prolonged ice age instantly blankets the country. The boilers chill, the factories barely breathe, and electricity is supplied with rolling blackouts. Thoughts within Central Administration flow slowly and sluggishly, like thickening fuel oil. A bitter cold paralyzes every region, and because the drainage pumps have ground to a halt, public utilities cannot clear water from the streets — the city begins to rapidly freeze and become covered in dense edema.

For the emergency resuscitation of the collapsed energy grid, an outside expert is appointed to the facility — Levothyroxine. He is a precise, flawlessly trained external understudy of the TPP's native chief. He is forced to operate under strict regulations. He demands to be delivered to the city strictly at dawn — orally as a morning tablet, on an empty stomach, while the rest of the organism's logistics and transport flows are still asleep. Upon arriving at the TPP, Levothyroxine freely penetrates into all freezing tissues and binds directly to receptors inside the cells. He personally reignites the boilers, starts the turbines, and slowly but surely returns long-awaited warmth to the regions. This specialist requires 7 to 12 days of continuous duty to completely overhaul the country's shattered heating network and lead the State out of its ice age.

However, the TPP can also be struck by the exact opposite madness. Sometimes, the Ministry of Energy goes mad with power and orchestrates total, uncontrolled overheating — thyrotoxicosis (hyperthyroidism). Officials begin throwing all coal and gold reserves into the furnace indiscriminately. Boilers boil over, steam bursts from the pipes, pistons melt, and the country's vital resources burn away in a matter of seconds. The heart-motor roars at extreme RPMs, street temperatures skyrocket, the city shakes with tremors, and it literally burns up from the inside.

To prevent a thermal explosion, official saboteurs — Antithyroid agents (Thiamazole) — are dropped into the crazed TPP. In personnel documents, they are listed as “saboteurs”. Their operational task is to carry out targeted sabotage on the Ministry's assembly lines. Thiamazole penetrates the workshops and tightly blocks a key enzyme — thyroid peroxidase — which is responsible for assembling new energy hormones. Production ceases. The turbines stop, and the thyroid gland can no longer supply the “fuel” used to scorch the country. The saboteurs act

methodically: they completely extinguish the raging boilers over the course of several days, patiently waiting for the old, previously created hormone warehouses to be depleted.

Professional Risks:

Working at such a hazardous strategic facility entails colossal risks. If the understudy, Levothyroxine, exceeds his authority or miscalculates, he will trigger an artificial overheating of the system himself — causing panic, insomnia, hand tremors, and rampant tachycardia in the city.

Meanwhile, the saboteur, Thiamazole, acts too aggressively in rare instances. Getting carried away with the diversion at the TPP, he may accidentally block the operations of other vital facilities — the strategic defense plants of the bone marrow. This halts the production of protective blood cells (agranulocytosis), leaving the State defenseless against any infection. For this reason, sending saboteurs to the TPP is strictly prohibited if the city already faces severe problems with its blood count and safety.

Specialist Profile

- Name of the Pharmacological Group: Thyroid and antithyroid agents.
- Place of Service in the Organism: All cells of the Body-State (governance of basal metabolism).
- Working Tool (Mechanism): Levothyroxine binds to nuclear T3/T4 receptors in all tissues. Thiamazole blocks the enzyme thyroid peroxidase, completely halting the assembly of new energy hormones.
- Side Effects: Tachycardia, tremors, and insomnia (in case of an overdose of the understudy, Levothyroxine); a drop in white blood cell levels — agranulocytosis (a risk when the saboteur, Thiamazole, is at work).
- Affected Organs (Risks): The cardiovascular system and bone marrow.
- Conditions of Admission (Indications): Hypothyroidism and endemic goiter (for Levothyroxine); thyrotoxicosis and preparation for surgery at the TPP (for Thiamazole).
- Categorical Contraindications: Untreated thyrotoxicosis and acute myocardial infarction (for the understudy); severe blood count disorders (for the saboteur).
- Site Restrictions: Levothyroxine requires strict morning intake on an empty stomach, well before the rest of the body's transport and digestive logistics are launched.
- Transport and Logistics (Dosage Forms): Tablets for oral administration.
- Delivery Speed: Slow. Levothyroxine requires up to 7—12 days of duty to completely rebuild the country's heating network. Thiamazole damps down the boilers gradually over several days until the old hormone warehouses run dry.

3. Diplomatic Peacekeepers of Emergencies

When the State is threatened by a sudden external attack or a severe internal crisis, the head of the Security Council, the Hypothalamus, instantly sounds the alarm, hits the red button, and deploys a brutal and ruthless general into the bloodstream — Adrenaline. The general knows no pity and does not believe in compromises. He immediately enforces total martial law across the country.

Adrenaline seizes all radio towers and command posts — receptors — and screams into his megaphone: “Faster! Even faster! Work to the absolute limit!”. By his command, all peaceful rear services are completely shut down and stripped of funding — public utilities (the GI tract) and digestion grind to a halt, and factories close. The entire gold reserve and blood flows are rerouted exclusively to combat units — the muscles. Under the command of the furious general, the heart-motor begins to pound violently, pistons melt, and pressure within the vessel-pipes skyrockets to critical levels.

If this adrenaline-fueled assault drags on and the country enters a state of chronic stress, catastrophe strikes. Transport routes wear out, the pistons of the main motor crack from overload, and the entire system finds itself one step away from a massive heart attack and complete destruction.

To prevent the demise of the State, diplomatic peacekeepers — beta-blockers (Bisoprolol) — arrive urgently at the scalding facility.

Their oral tablet transport delivers them to the emergency site swiftly — within just 1—2 hours of arrival, they take control of the heart's control panels. Acting as clever competitive antagonists, the peacekeepers do not engage in open combat with General Adrenaline. They act more cunningly: they physically enter the command posts — beta-1-adrenergic receptors in the heart tissues — and block them with their shields. The peacekeepers carefully plug the ears of the receptors, jam them with powerful signal scramblers, and completely block Adrenaline's furious orders. No matter how much the general screams into his megaphones, the heart no longer hears him. The motor exhales, slows its RPMs, the pistons cool down, and the life rhythm and pressure smoothly return to peaceful, safe metrics. For this unique ability to restore peace, Bisoprolol is officially hired by the Ministry of Transport to tame rebelling vessels.

Professional Risks:

A peacekeeping mission is highly delicate, precision work. If the diplomats overstep and lock down too many control panels, the heart will drop its RPMs below a safe minimum. This will plunge the country into a dangerous slowing of the pulse (bradycardia) and a critical drop in pressure — leaving factories starved of supplies once more, but this time due to a deficit in blood flow.

Furthermore, if inexperienced peacekeepers accidentally block the adjacent panels of another department (Beta-2 receptors), it will cause the immediate closure of ventilation shafts — a severe bronchospasm. Air will stop entering the city, and the State will begin to suffocate. Because of this, Bisoprolol is strictly contraindicated in cases of bronchial asthma and cardiogenic shock.

But the most critical and unbendable rule of their contract is that peacekeepers are categorically forbidden from an abrupt, sudden withdrawal from the facility. If one simply stops taking the tablets, a fierce “rebound syndrome” will erupt across the country. The insulted General Adrenaline, seeing that the scramblers are gone, will storm the control panels and strike the defenseless heart with redoubled, punitive fury, inevitably leading to a catastrophe.

Specialist Profile

- Name of the Pharmacological Group: Beta-blockers.
- Place of Service in the Organism: The cardiovascular system (the main transport routes and the motor of the country).
- Working Tool (Mechanism): Beta-1-adrenergic receptors in heart tissues. The specialist acts as a competitive antagonist, physically shielding the receptor from adrenaline's commands.
- Side Effects: Excessive slowing of the pulse (bradycardia), a critical drop in blood pressure, and dangerous bronchospasms.
- Affected Organs (Risks): The heart and lungs (the bronchial tree).
- Conditions of Admission (Indications): Arterial hypertension, ischemic heart disease, chronic heart failure, and severe rhythm disorders (tachycardia).
- Categorical Contraindications: Acute heart failure, cardiogenic shock, pronounced bradycardia, and bronchial asthma.
- Main Contract Restriction: An abrupt withdrawal of peacekeepers from the facility is categorically prohibited — a severe “rebound syndrome” will occur, risking a vascular catastrophe.
- Transport and Logistics (Dosage Forms): Tablets for oral intake.
- Delivery Speed: High. The peacekeepers take full control of the heart's control panels within 1—2 hours of arriving at the facility.

4. Invited Foreign Consultants of the Department of Demography

The Department of Demography is fully responsible for the uninterrupted continuation of the lineage, social well-being, and external presentation of our Body-State. During peaceful years, its own proven staff labors here tirelessly. Estrogens work as ambitious ministers of female elegance — they strictly oversee the construction of solid bone reinforcements, maintain the ideal smoothness

and velvet texture of the skin, and shield the primary vessel-roads from premature wear. At the exact same time, Gestagens operate as a quiet yet incredibly effective Committee for Maternal Protection and Stability Maintenance.

However, time is relentless, and when a natural, nature-mandated age crisis (menopause) hits the Department, the production of native ministerial staff rapidly winds down. Officials leave their posts, and offices empty. Without their firm control, the State begins to smoothly but irreversibly wither: bone-walls thin out and crack, skin loses its former luster, and spontaneous fires break out on once-safe vessel-roads in the form of hot flashes and vascular storms.

To restore the departments' former crisp structure, strengthen the load-bearing configurations of buildings, and prevent the country from prematurely turning into ruins, the government decides to enlist external aid — hormone replacement therapy (HRT). These are elite invited foreign consultants. They arrive in the city to temporarily occupy the vacant ministerial chairs. The consultant-hormones penetrate the dormant departments, bind to specific intracellular receptors, and begin confidently issuing orders, mimicking the work of the previous leadership. Life inside the Department buzzes once more, and vascular riots subside.

Professional Risks:

The introduction of foreign managers requires textbook precision and caution. If these consultants overstay their welcome in their chairs or begin excessively stimulating the factories that produce blood clotting factors in the liver, deadly gridlocks — thromboses — will instantly form on the main transport routes.

Furthermore, their prolonged presence can provoke a covert mutiny of cells within the tissues of the mammary glands or uterus, which is capable of escalating into hormone-dependent tumors. For this reason, the contract with foreigners requires a regular and stringent audit: the specialists need constant monitoring by the security service (mammography and ultrasound), and at the slightest suspicion of a cellular riot, their mission is immediately terminated.

Specialist Profile

- Name of the Pharmacological Group: Estrogens, progestogens, their analogs, and combinations.
- Place of Service in the Organism: The reproductive system, bone tissue, and vascular highways.
- Working Tool (Mechanism): Specific intracellular estrogen and progesterone receptors in target tissues.
- Side Effects: Painful engorgement of the mammary glands, migraine-like headaches, and an increased risk of blood clot formation on vessel-roads.
- Affected Organs (Risks): Deep veins of the lower extremities (risk of thromboembolism), the liver, and mammary gland tissues.
- Conditions of Admission (Indications): Severe manifestations of menopausal syndrome (hot flashes, sweating) and the prevention of postmenopausal bone depletion (osteoporosis).
- Categorical Contraindications: A history of hormone-dependent tumors or suspicion thereof, acute venous or arterial thrombosis, and severe destructive liver lesions.
- Site Restrictions: A strict, rigorous annual audit is required (mammography, oncocytology) to detect and suppress any internal cell mutiny in time.
- Transport and Logistics (Dosage Forms): Tablets, transdermal gels, and patches. They are administered orally or topically (the latter allows them to arrive at the facility by bypassing the liver customs).
- Delivery Speed: Average. The support program unfolds smoothly; systemic effects and the stabilization of the city are locked in after several weeks of a scheduled course.

5. Inspectors of Structural Supervision and Building Soundness

The primary duty of this strict architectural and building inspection is to ensure that the load-bearing structures of the Body-State (the bones of our skeleton) remain monolithic, strong, and easily endure any everyday stresses and blows of fate. Within the bone department, a massive reconstruction takes place continuously, day and night, where two opposing crews labor without pause. The first — osteoblasts — are the creators, neat construction workers erecting new, solid layers of bone tissue. The second — osteoclasts — are brutal demolition-destruction workers whose task is to recycle old, spent, and worn-out building material in a timely manner. Normally, an ideal balance reigns between them.

However, during severe systemic crises (for example, the age-related leaching of calcium), the demolition crew suddenly loses its mind. The osteoclasts begin smashing load-bearing walls, columns, and building beams with frantic, fanatical speed, absolutely refusing to wait for the construction workers to pour fresh concrete. The state's skeleton turns into a fragile, porous sieve, ready to collapse from the slightest nudge. The Bisphosphonates' instructions command them to immediately infiltrate the ruined construction site and heavily crack down on the maddened destroyers.

Using their unique chemical phosphate “anchors,” the drug molecules literally sink their teeth into the mineral structure of bone beams and fall silent, setting up a hidden ambush. When an unsuspecting osteoclast attempts to “bite off” another chunk of bone wall, it swallows the lurking inspector along with it. Once inside the destroyer, the Bisphosphonate acts instantly: it blocks a key enzyme, completely decimates the internal cellular skeleton of the osteoclast, and forcefully dispatches it to the scrap heap, triggering a program of cellular suicide (apoptosis). The demolition of buildings halts completely, and construction workers finally gain the opportunity to calmly restore the destroyed walls.

Professional Risks:

These architectural inspectors are chemically incredibly aggressive, corrosive, and toxic during direct transportation. If, due to haste or carelessness, they accidentally get stuck in the main transport tunnel — the esophagus — en route to the construction site, they will literally begin burning and eroding the mucous membrane, leading to severe erosive esophagitis and deep ulcers.

This is precisely why a strict, unviolable working protocol exists for Bisphosphonates: they are delivered to the city exclusively in the morning, strictly on an empty stomach, washed down with a huge glass of pure water. But most importantly — after this, the specialist is obliged to stand or sit strictly upright for at least half an hour!. It is categorically forbidden to lie down, in order to eliminate the risk of the corrosive chemical washing back into the esophagus. Furthermore, during long-term service, inspectors may overdo it and make bones too dense yet brittle, which in rare cases threatens tissue death in the jaw area (osteonecrosis).

Specialist Profile

- Name of the Pharmacological Group: Bisphosphonates.
- Place of Service in the Organism: The musculoskeletal system, bone tissue (the entire load-bearing skeleton of the state).
- Working Tool (Mechanism): The molecular target is a specific enzyme inside the cells of destruction (osteoclasts). The delivery channel is the hydroxyapatite crystals of the bone, where the drug integrates itself using phosphate “anchors”.
- Side Effects: Severe erosive irritation of the esophagus and stomach, GI discomfort; with many years of continuous work — the risk of developing osteonecrosis of the jaw.
- Affected Organs (Risks): The mucous membrane of the esophagus, the stomach, and the bone tissue of the jaw.
- Conditions of Admission (Indications): Systemic depletion of bone tissue (postmenopausal and senile osteoporosis), Page's disease, and metastatic bone lesions.

- **Categorical Contraindications:** Severe organic damage or narrowing of the esophagus (achalasia, strictures), peptic ulcer disease in the acute phase, acute renal failure, and critically low blood calcium levels (hypocalcemia).

- **Strict Restrictions:** Tablets are taken only on an empty stomach, with a glass of pure water, after which it is forbidden to assume a horizontal position for 30—60 minutes! Do not lie down!.

- **Dosage Forms and Routes:** Film-coated tablets; solutions for intravenous infusions (IV drips). Routes — oral or parenteral.

- **Delivery Speed:** Via the oral route, absorption at the GI customs is negligibly small (only 1—3%), but the drop team settles immovably in the skeleton for months and years. With intravenous administration, the drop team arrives instantly and protects the bone buildings for an entire year ahead after a single operation.

6. Elite Group of Chief Structural Engineers

While all other external specialists work with already existing living ministers, officials, and labor crews on the ground, Gene Therapy represents the highest technological elite — the scientist-demigods. They do not lower themselves to writing instructions for petty clerks. They descend into the most sacred place in the city — the secret state archive, where the original blueprints, matrices, and the sacred constitution of the country — the cell nucleus and DNA molecules — are kept under seven seals.

It happens that within this master blueprint, right from the birth of the state, a fatal, tragic typo was made — an inherited genetic disease (for example, SMA or hemophilia). Due to a single incorrect letter in the drafting scheme, the organism's factories produce defective, non-viable parts throughout its life, or fail to manufacture a vital protein altogether. The country slowly fades away.

Gene therapy is delivered to the archive via a special, hyper-technological, shielded bio-transport — viral vectors (these are viruses from which the combat payload-poison has been removed, leaving only an empty capsule-shell). The engineers penetrate the very heart of the archive, locate the defective page of the blueprint, carefully excise the flaw, and paste in an ideal, artificially created, corrected blueprint. Having received the correct scheme, the factory-cell breathes a sigh of relief and begins manufacturing proper, healthy structures just as if the terrible breakdown had never existed. This is the pinnacle and triumph of modern medical science.

Professional Risks:

The appearance of such a powerful and profound external engineering bureau in the state always frightens and infuriates the regular internal Army — the immune system. Soldiers at checkpoints may mistake the delivery engineers for dangerous aggressors and attempt to storm their bio-transport. This provokes a massive, violent immune response and a temporary, severe failure at the main filtration plant — the liver chemical complex, which bears the brunt of the strike.

Furthermore, if the organism already possesses massive, ready-made antibodies against the specific vector-virus from past encounters, the army will destroy the elite engineers right on the doorstep, ruining the operation. But if the special operation succeeds, the blueprints of the constitution are corrected once and for all remaining life.

Specialist Profile

- **Name of the Pharmacological Group:** Gene therapy products (based on viral or non-viral vectors).

- **Place of Service in the Organism:** The cell nucleus, DNA, and RNA molecules (the main classified state archive).

- **Working Tool (Mechanism):** Functional genes within the DNA structure, viral delivery vectors (for example, adeno-associated virus type 9).

- **Side Effects:** An acute systemic immune response (cytokine storm), a temporary toxic disruption of the liver chemical plant accompanied by a sharp spike in liver enzymes.

- **Affected Organs (Risks):** The liver (as the primary filter and center for the initial reception of foreign biological objects) and the immune system.
- **Conditions of Admission (Indications):** Severe, previously incurable congenital genetic flaws (spinal muscular atrophy, hemophilia, certain types of congenital blindness).
- **Categorical Contraindications:** The presence of pre-existing massive protective antibodies against the specific delivery vector within the organism, and acute infectious fires in the body at the time of the operation.
- **Main Limitation:** Most often, this is a unique, one-time, and ultra-expensive special operation — corrections to the DNA constitution are made once and last a lifetime.
- **Specialist Transport:** Specialized bio-transport (viral vector-container).

Main Idea of the Chapter

State governance clearly teaches us that the fragile balance in the organism relies on the strictest subordination of decrees and the uninterrupted supply of resources to the regions. Any large-scale crisis — be it the inflation of the glucose-currency, an ice age at the TPP, adrenaline terror by security forces, or a fatal typo in the original DNA constitution — requires its own profile, narrow specialist. One who is capable of returning the system to a peaceful order without destroying the operations of neighboring departments.

Chapter 4. Communications and Telecommunications Service

The human Body-State is a massive, hyper-technological metropolis that is literally entangled in trillions of kilometers of the thinnest “fiber-optic cables” — nerve fibers. For this colossal structure to operate as a single, coordinated mechanism, management commands, reports from the outskirts, and alarm signals must be transmitted between departments at the speed of light. The internal information flow inside us never quietens down for even a single second.

However, our living “internet” has one crucial design feature. Nerve wires do not stretch in a continuous line from the brain to the fingertips — they consist of billions of individual segments. At the junctions of nerve cells — in tiny customs zones called synapses — the high-speed electrical signal inevitably gets stuck. It physically cannot jump across the abyss separating the cells.

And this is precisely where neurotransmitters step onto the scene — the couriers, cryptographers, and signalmen of our Communications Service. As soon as an electrical impulse runs to the edge of the cable, it transforms into a physical “packet of documents.” The sending cell releases the couriers into the synaptic cleft; they swim across it and deliver the secret cipher to the security checkpoint of the next cell.

But what happens if the Communications Service couriers are deathly tired, the state mail gets lost without a trace at sorting stations, and the main cables are severed by stress and illness? The country instantly descends into total informational chaos. The specialists we will meet in this chapter are elite signalmen, programmers, and stern system administrators whose sole task is to fix our body's internal internet, returning stable communications to the regions.

1. Logistics Controllers of the Department for Combating Systemic Pessimism

When the Body-State is dragged into a prolonged, exhausting economic crisis, the Communications Service is the first to take the hit. De-energized departments stop dispatching the main couriers of joy, tranquility, and motivation — the serotonin messengers — to various authorities. Information feeds empty out. Cut off from good news, Central Administration (the Brain) panics and begins broadcasting just one oppressive update to all regions around the clock: “Everything is bad. There are no gold and foreign exchange reserves. Zero prospects. Development programs are frozen; the factories might as well be closed.” We call this severe state of siege clinical depression.

In normal life, once the serotonin couriers have delivered a positive message to the next cell, regulations state they must return to their original base via a special pump-shuttle (a transporter protein) to go on a well-deserved “forced vacation.” But under crisis conditions, this return happens far too quickly: the couriers barely have time to stick their noses into the synaptic cleft before the base sucks them back in, depriving the city of communications.

At this moment, a strict inspector arrives at the facility — an Antidepressant from the SSRI group. His job description is simple: stop the panic on the communication lines. The SSRI specialist makes his way to the sorting center and tightly blocks the exits and return shuttles for the serotonin couriers, clogging the pump with his presence. The base is closed; there is no way back!

The couriers find themselves locked on the working line — in the synaptic cleft. Deprived of the opportunity to escape for a break, they are forced to remain in the square and knock on the receptor doors again and again, continuously transmitting positive signals. Gradually, the city's information channels are saturated with long-awaited good news. The Brain sees that stable communication has finally been established, and systemic pessimism begins to retreat, returning the State to a peaceful life.

2. Psychological Suppression Officers of Emergency Situations

Sometimes, it is not just a strike that erupts within the Ministry of Communications and the city's central substations, but a frantic, destructive panic. The neurons at the main control panels go mad, starting to scream chaotically, wildly, and far too loudly, overloading all channels with false, emergency anxiety. The internal internet explodes with millions of panic messages. The entire country freezes in paralyzing horror, wasting colossal, precious energy on empty, irrational fear and the convulsive expectation of a catastrophe. This nightmare lives in the city under the names of acute panic attacks, psychomotor agitation, or status epilepticus.

When civilian regulators are powerless to stop this mad screaming, an elite special forces unit — Tranquilizers and sedatives (such as benzodiazepines) — harshly deploys to the dispatch centers. In the State metaphor, these are the brutal Riot Police (OMON) Officers of the nervous system.

They arrive at the panic-overloaded control panels and, without further discussion, crank the power of the organism's built-in braking systems to the absolute maximum. Their work is incredibly spectacular: it is like pouring liquid nitrogen over a scalding, ready-to-explode server or activating total cellular communication jammers during a violent street riot.

The OMON fighters approach the main braking panels — the GABA-A (gamma-aminobutyric acid) receptors. Acting as allosteric modulators, they do not replace the native dispatcher of silence (GABA), but stand right beside him, helping him forcefully swing the chloride channels wide open. Negatively charged chloride ions rush inside the excited cells in a massive, icy torrent, instantly cooling their electrical potential. All panic screams, hysterics, and convulsive neural impulses immediately fall silent. Within minutes, an absolute, deafening, yet life-saving silence, blissful relaxation, and peace blanket the terror-stricken country.

Professional Risks:

Such total, forceful jamming of communications has its own reverse, dark side. While shutting down the panic, the OMON officers concurrently disable useful, operational signals managing movement, memory, and wakefulness. A pronounced, insurmountable drowsiness, muscle weakness (arms and legs turn to jelly), and a severe slowing of all reactions blanket the country. The brain begins to struggle with writing information into the memory archives.

In the event of a severe overdose, the special forces might accidentally block the control panels of the respiratory center, and the city will simply stop pumping air. But the greatest danger is the formation of a rigid, slave-like dependence on the “officers of silence” during a prolonged contract. The organism forgets how to brake itself and demands the special forces again and again. For this reason, their service is strictly limited to short courses (up to 2—4 weeks), and during their duty, citizens are categorically forbidden from getting behind the wheel of city transport.

Конец ознакомительного фрагмента.

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