

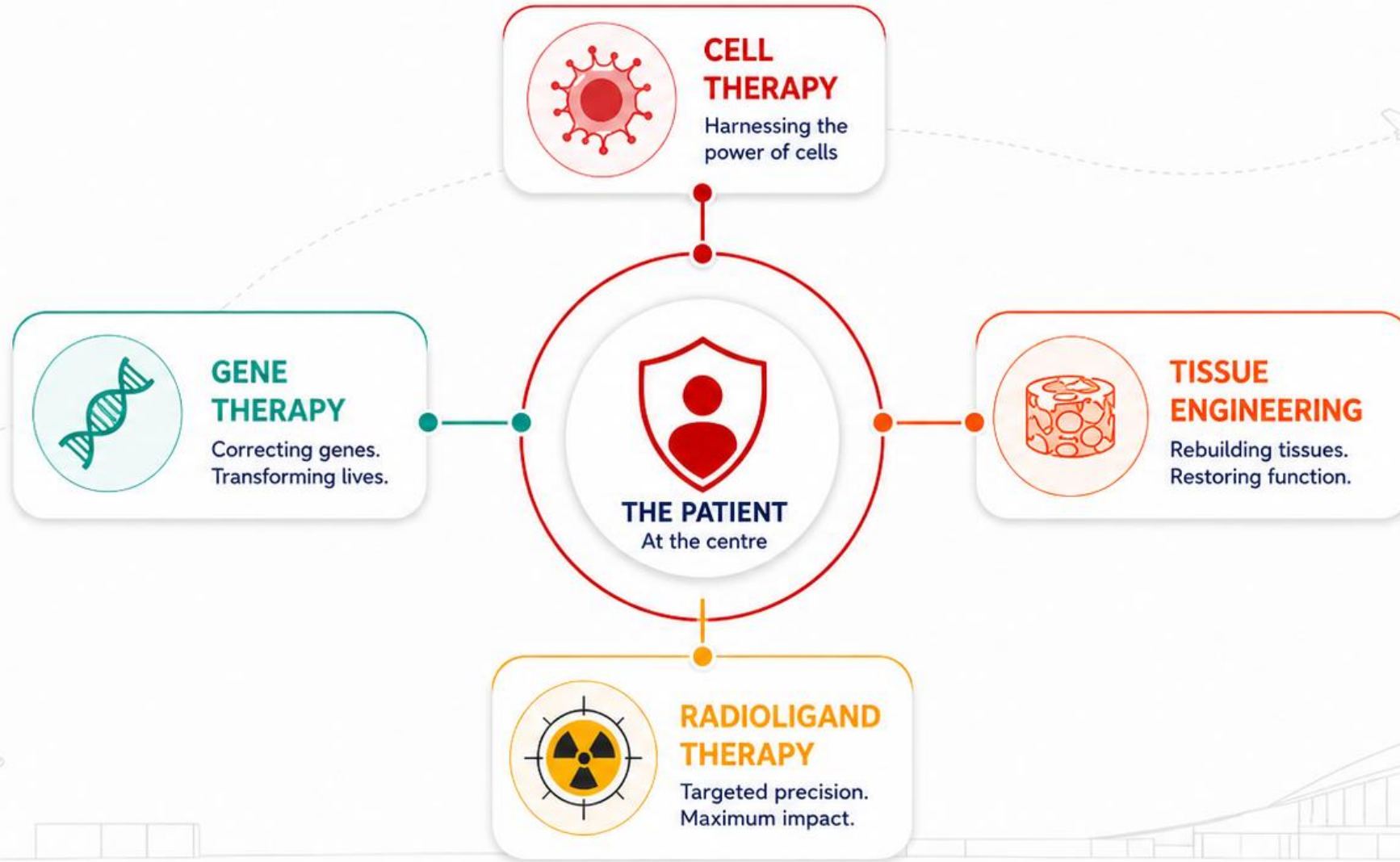


Precision Therapy Logistics Gateway

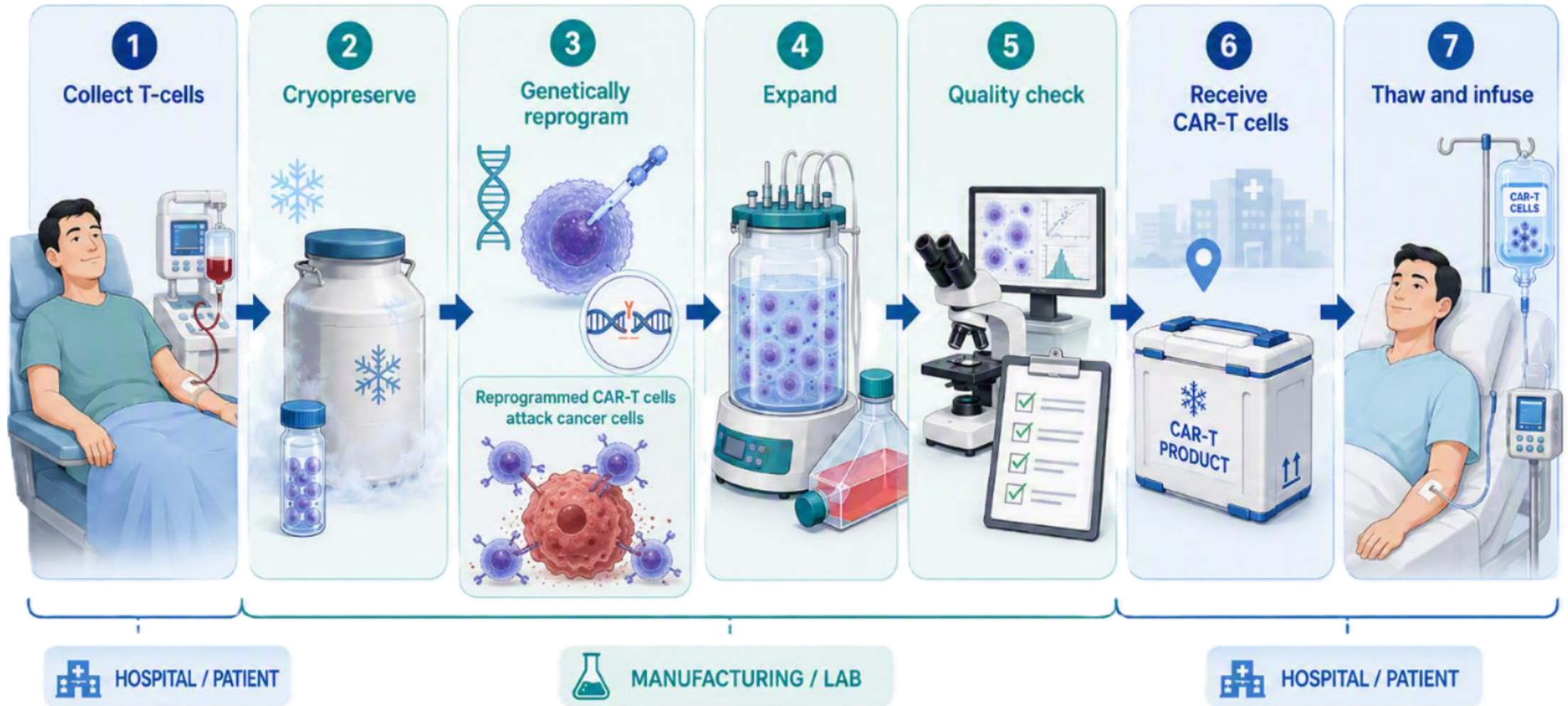
World Aviation Conference • Incheon • September 2026

Precision therapies landscape

Multiple modalities. One goal: the right therapy for every patient.



Cell therapy: CAR-T



CAR-T is a round trip, not a shipment.

The patient's T-cells travel to the U.S. for manufacturing and return as a patient-specific CAR-T dose.
Real case at St. Mary's Hospital in Seoul, treated with Kymriah (Novartis)



BUILT ON ASSURANCE

Chain of identity
Patient, cells and product always linked

Cryogenic integrity
Validated containers, monitoring and contingency

Time-critical process
Pre-clearance and exception management

Secure custody
Controlled hand-offs and end-to-end visibility

Hospital readiness
Receipt, identity check, thaw and infusion

PATIENT

T-CELLS

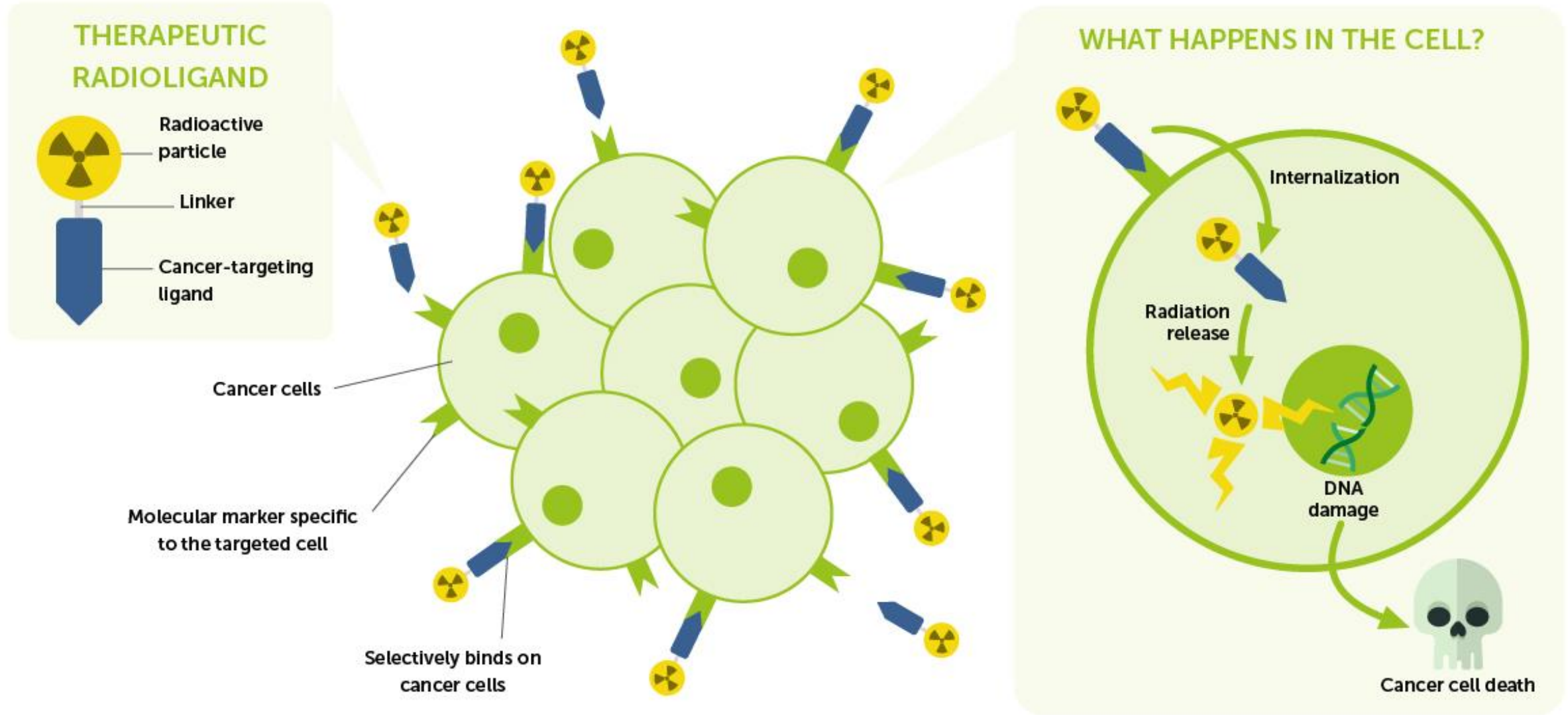
CAR-T PRODUCT

One patient • One batch • One clinical window

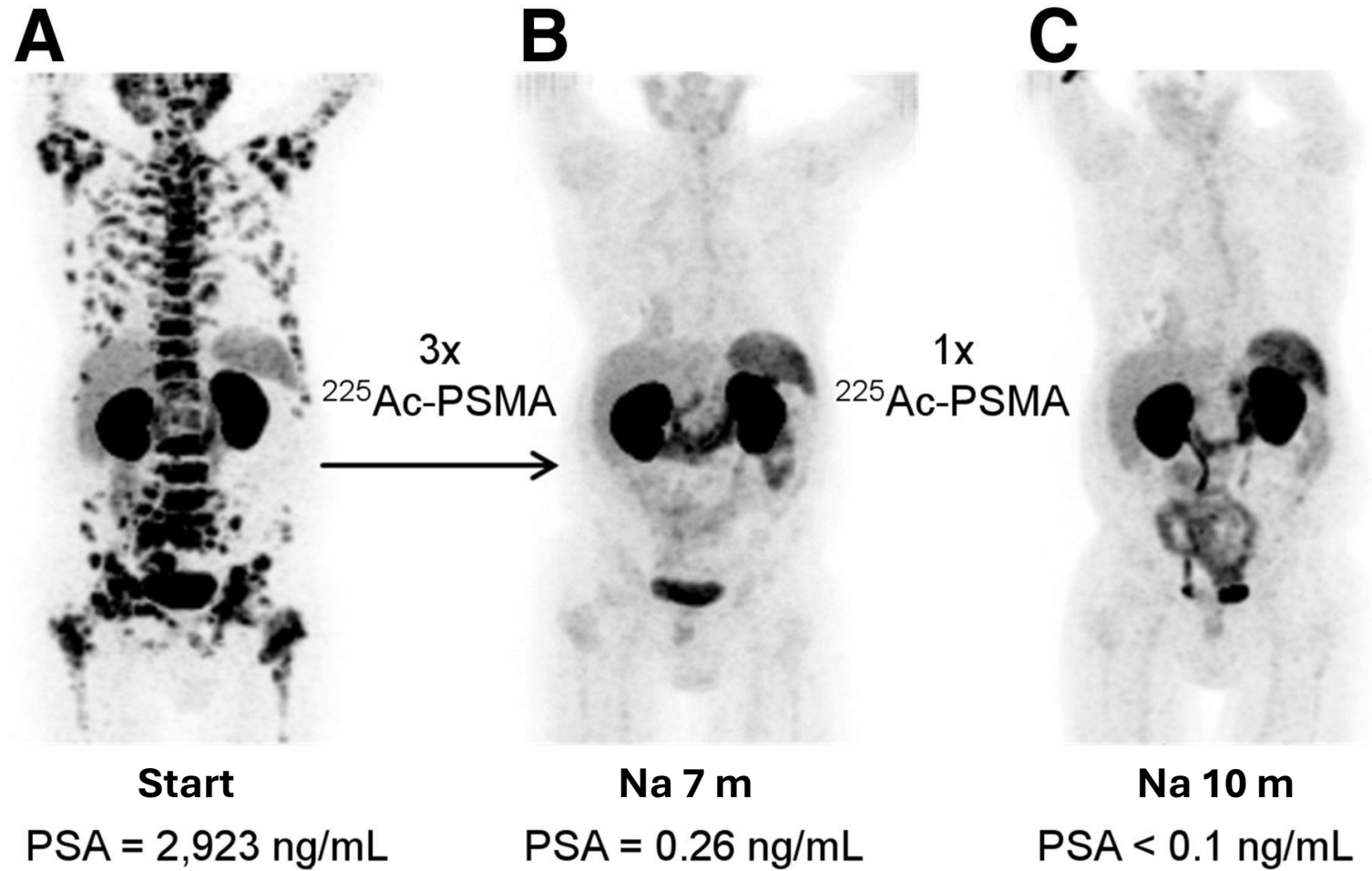
Every step. Verified. Every hand-off. Accountable. Every time.

Radioligand therapy

How do radioligands work in cancer therapy?



Radioligand therapy



The decay clock never stops. One patient. One dose. One critical path.

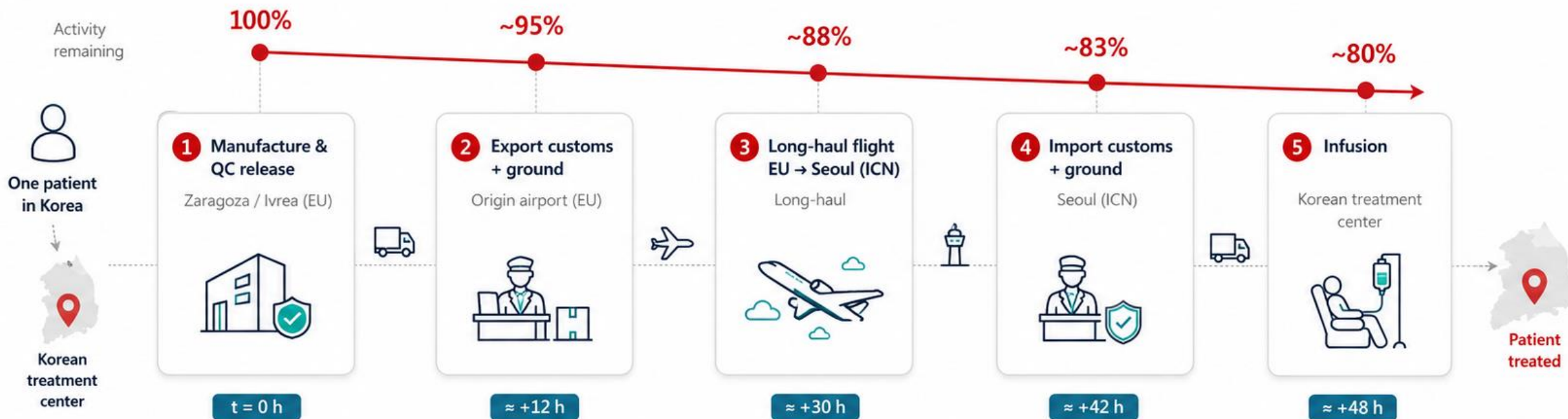
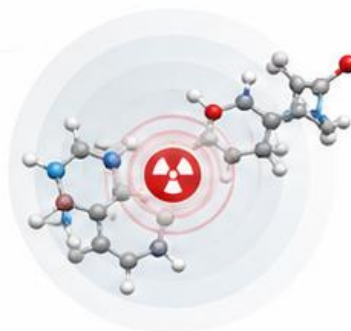
A patient-specific Lu-177 (Pluvicto) dose travels from European manufacture to a Korean treatment center



Lu-177 (Pluvicto) half-life

6.6 days

≈ 10% activity is lost per day



Every hour in transit is unrecoverable dose loss. The logistics chain is the therapy's critical path.

Precision Therapies

Save lives, often last resort, very frail patients

Extremely valuable, high cost

Transport: extremely time- and temperature-sensitive



Precision Therapy Logistics Gateway

*“The **Precision Therapy Logistics Gateway (PTLG)** project aims to develop a **secure, reliable, and standardized logistics chain** for innovative precision therapies, such as cell and gene therapies. By designing and validating specific standards, the initiative seeks to establish an **international benchmark** for the transport of patient-critical, fragile, and high-value medical shipments.”*

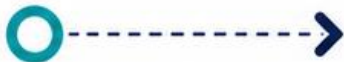
Project partners



Funding partners



PTLG project: from evidence to implementation



PHASE

1



Exploratory Phase



COMPLETED



White paper and
challenges mapped

COORDINATED BY



PTLG project: from evidence to implementation



COORDINATED BY



COORDINATED BY



PTLG project: from evidence to implementation



COORDINATED BY



COORDINATED BY



COORDINATED BY



PTLG project: from evidence to implementation



COORDINATED BY



COORDINATED BY



COORDINATED BY



COORDINATED BY



Not like general cargo.

Same aircraft, different risk profile.



General pharma cargo

Standard. Replaceable. Low risk.



2-8 °C
cold chain



Reorderable
stock



Batch
verified



Lower impact if disrupted

Same
aircraft

Precision therapy cargo

Irreplaceable. Time-critical. High risk.



Patient
specific



Cryogenic
/ extreme



No buffer
- decay clock



Secure
identity &
custody



High impact if compromised

Five constraints that general cargo handling was not designed for

1

Deep cold, many ranges

Ambient, 2–8 °C, –80 °C and cryogenic –150 °C in the same flow — dry ice and liquid nitrogen on board.

2

The clock is biological

Every minute in transit lowers efficacy. Radioligands decay; fresh cells degrade. There is no buffer stock to fall back on.

3

Chain of Identity

For autologous therapies the patient is the product. A single mix-up is a wrong-patient event, not a paperwork error.

4

Dangerous goods & security

Dry ice, LN₂ and radioactivity trigger DG rules and special packaging — and radiation limits block standard X-ray screening.

5

Invisible failure

A cryogenic excursion or lost activity leaves no visible sign. The failure only surfaces at the patient's bedside.



Logistical Challenges



PRODUCT

No copy possible (f.e autologous therapies)

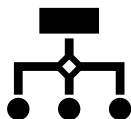
INVENTORY

Strict temperature control required

PRODUCT STABILITY

Very short shelf life and lead times.

SHELF LIFE



PROCESS

Limited standardization and harmonization

STANDARDIZATION

Complex processes and quality management

QUALITY

Transparency and real-time visibility often lacking

TRACKING



PEOPLE

Lack of knowledge among customs and logistics personnel

KNOWLEDGE

Training needed in cold chain management

TRAINING

24/7 availability is required

RESPONSIVENESS



No single framework was built for precision therapies

Existing standards cover important parts— but none address the **critical airport handover**.

Good Distribution Practice

Focuses on storage and transport conditions.



GDP

IATA Center of Excellence for Independent Validators

Focuses on air cargo quality systems.



**CEIV
Pharma**

Temperature controlled logistics

Focuses on packaging performance.



**ISO
21973**



The missing piece:
airport handover



GMP

Good Manufacturing Practice

Focuses on product manufacture.



DGR

Dangerous Goods Regulations

Focuses on safety of dangerous substances.

Precision therapy shipments have five critical requirement domains



Temperature integrity

Maintain the right temperature, at every step.



Time-critical logistics

Minimize time in transit and handovers.



Chain of identity

Protect product identity from origin to patient.



Dangerous goods

Ensure safe handling of potentially hazardous materials.



Documentation & trace

Ensure complete, accurate and audit-ready records.



Without a dedicated framework for the airport handover, a critical gap remains in the precision therapy supply chain.



Proof: we have already flown it

Real intercontinental precision-therapy test lane: Antwerp / UZA to Dallas / Biolabs



LIVE QUALIFIED
TEST SHIPMENTS



ORIGIN

Antwerp / UZA
Belgium



DESTINATION

Dallas / Biolabs
USA

1. COURIER PICK-UP



Validated packing at UZA.
Chain-of-custody &
temperature logging
activated.

2. ROAD TRANSPORT



Secure, temperature-
controlled transport
to Brussels Airport.

3. AIRPORT WAREHOUSE (PTLG PHARMA HUB)



Received into PTLG certified
pharma handling area.
Temp. monitoring &
exception management.

4. AIR TRANSPORT



Boarded as priority shipment
on direct flight
BRU → DFW.

5. CUSTOMS CLEARANCE



Expedited clearance
for time-critical, non-routine
biological shipment.

6. RECEIVING LAB



Received at Biolabs Dallas.
Condition, data & chain-of-
custody confirmed.

Proof: we have already flown it

Real intercontinental precision-therapy test lane: Antwerp / UZA to Dallas / Biolabs



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Boarded as priority shipment on direct flight BRU → DFW.

5. CUSTOMS CLEARANCE



Expedited clearance for time-critical, non-routine biological shipment.

6. RECEIVING LAB



Received at Biolabs Dallas. Condition, data & chain-of-custody confirmed.

5 LESSONS LEARNED



1. PRIORITY ERODES IN NORMAL WAREHOUSE

In mixed freight flows, critical shipments lose visibility and speed.



2. X-RAY EXPOSURE RISK

Uncontrolled screening can compromise cell & gene therapy viability.



3. COMMUNICATION BREAKS DOWN DURING EXCEPTIONS

Fragmented updates delay decisions when time is critical.



4. CUSTOMS GAPS STALL TIME-CRITICAL CARGO

Incomplete or incorrect data leads to holds and rework.



5. DIFFERENT HANDOVER TRAINING STANDARDS

Variable competence at handover creates risk to shipment integrity.

PTLG Test shipment insights

Routing



Shipment conditions

- LSP's were randomized
- Freight Forwarder was notified 14 days in advance of next shipment
- Shipments carried out in summer and winter circumstances
- Requested transport temperature: CRT

Shipment types

1 Type 1: Cell Therapies

- Content: real cell material
- Product temperature: Cryogenic
- Packaging: LN2

2 Type 2: Gene Therapies

- Content: real mRNA material
- Product temperature: ULT
- Packaging: Dry ice

3 Type 3: Tissue Engineered Products

- Content: Blood
- Product temperature: Refrigerated
- Packaging: PCM



PTLG Test shipment insights



90% of the journey happens on the ground

7.6 days on the ground 17.7 h in the air

8.3 days

Median door-to-door

17.7 h

Total airline custody, including waiting

7.6 days?!

Everything else

Median	
Airline custody (per leg)	9 - 11 h
Ground steps	10 – 26 h

The airline is the most predictable part of the cold chain

SHARE OF TOTAL DOOR-TO-DOOR TIME



PTLG Test shipment insights

Logistics follow the weekly rhythm:
Zero shipments departed or delivered on a weekend

Arrival day at destination handler decides the rest of the journey:

Arrival at destination handler	Average time to delivery	+2,2 days same lane, same parties, different weekday. 31% of all elapsed time in the final leg falls on a weekend
Monday – Wednesday	3,6 days	
Thursday – Sunday	5,8 days	



Flights are scheduled to the minute, then shipments wait until it's Monday to move....

PTLG turns the airport black box into a glass box

From opaque to observable. Every handover. Every condition. Every time.

People on the ground • Data in the cloud • Secured corridors

**Trained people + dedicated facility**1

- ✓ Right-sized, validated facility for precision therapies
- ✓ Staff trained in ATMP / GxP handling
- ✓ Custody discipline at every risky handover
- ✓ X-ray-free zones and controlled environments where required



**Real-time data layer — the glass box**2

- ✓ One source of truth for every shipment
- ✓ Real-time monitoring: temperature, timing, exposure, location
- ✓ Milestones: warehouse → tarmac → loaded → airborne
- ✓ Automatic exception alerts, not after-the-fact reports
- ✓ Evidence at every step, always audit-ready

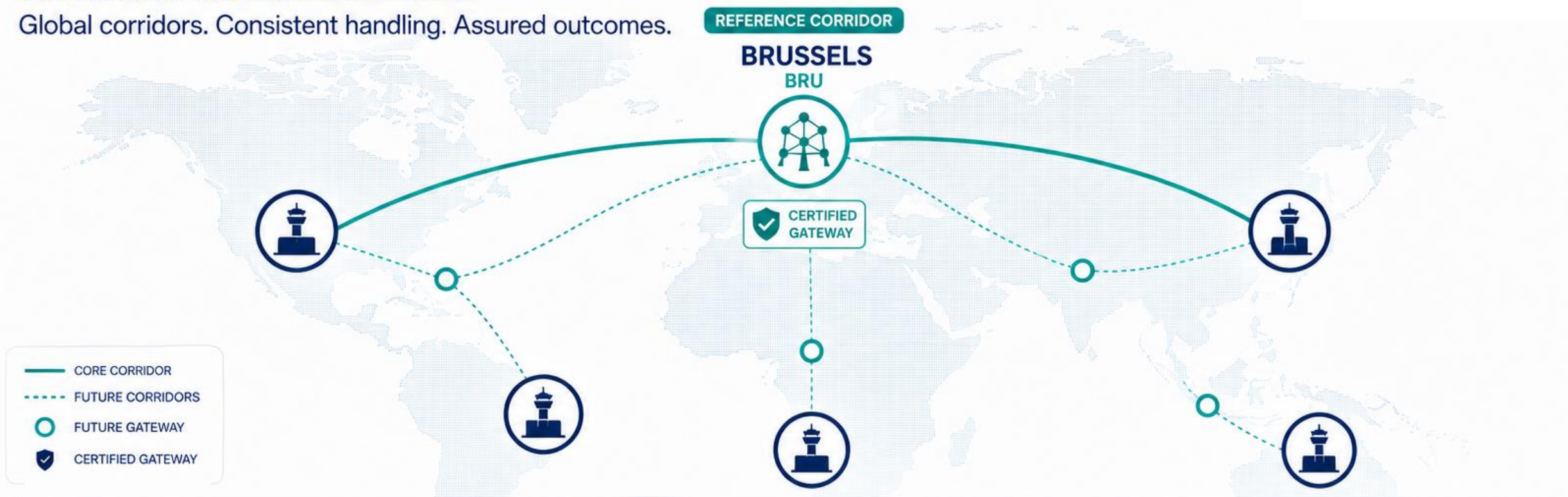
**Secured corridors + Center of Excellence**3

- ✓ Door-to-door secured corridors with clear ownership
- ✓ SOPs, chain-of-identity discipline and data captured the same way at every gateway
- ✓ One recognizable package label — handle under strict conditions
- ✓ Brussels as the playbook — exported to other airports globally

One airport is not enough

One standard. One label. One network.

Global corridors. Consistent handling. Assured outcomes.



1

Shared standard

SOP and
chain-of-identity
discipline



2

Visible label

Recognizable
package label for
strict handling



3

Training & certification

Qualified gateways
in one network



A corridor only works if both ends handle the shipment the same way.

WHAT PTLG IS



**People on the ground.
Data in the cloud.
Corridors made transparent.**



PEOPLE & EXPERTISE
ON THE GROUND



DATA
IN THE CLOUD



SECURED CORRIDORS
WORLDWIDE

Let's build the network — together

Creating a global network of precision-therapy gateways to deliver life-saving therapies, safely, on time, to patients worldwide.

PTLG⁷
Precision Therapy
Logistics Gateway



AIRPORTS

Become a certified PTLG gateway. We share the playbook, the training and the standard — you set the pace.



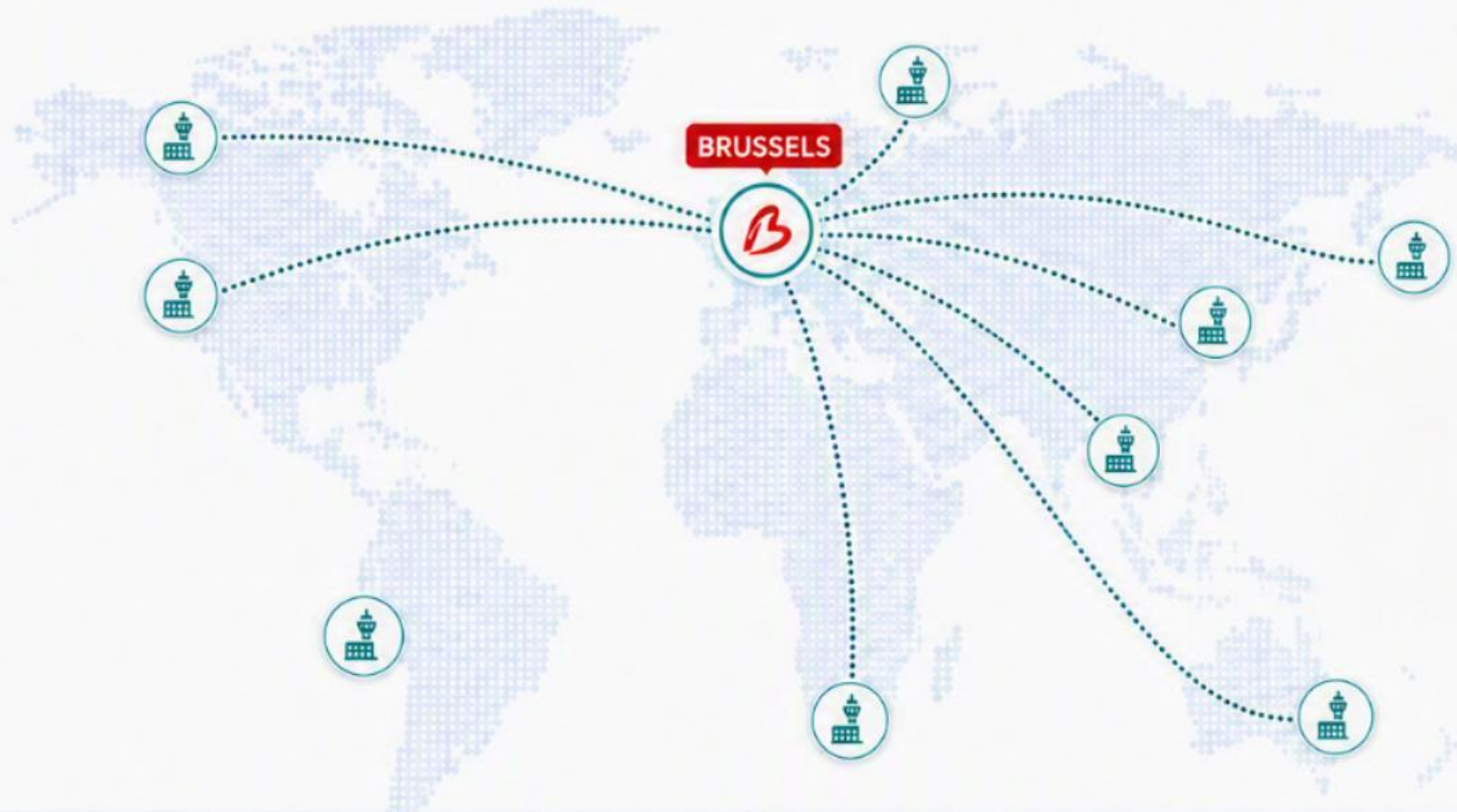
AIRLINES & FORWARDERS

Help us close the corridors your customers' therapies already fly, with data that follows the box.



IATA & REGULATORS

Help turn our guidelines into a recognized standard for precision-therapy handling.



**One network.
One standard.
One mission:**



Getting a **€2M**, life-saving therapy to a patient, anywhere in the world, on time and intact.



Because every shipment is personal.
Because every minute matters.

Thank you

Precision Therapy Logistics Gateway

Let's make life-saving therapies travel safely — from any airport to any patient.

Interested?

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