NPP-MENKES

2026

NAMED-PATIENTS PROGRAM FOR MENKES TREAMENT with ELESCLOMOL-COPPER BY MENKES INTERNATIONAL

Menkes International Association

Copper Rare Foundation

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BACKGROUND

The Named-Patient Program (NPP) for treating children with Menkes disease (NPP-Menkes of Menkes International) was launched in 2020, following the publication of treatment results using elesclomol-copper (ES-Cu) in a murine model of the disease in the journal Science (Guthrie et al., 2020), the result of research led by Vishal Gohil and James Sacchettini.

This initiative was led by Aurora Mateos, the mother of the first child treated. It was organized within the framework of the Menkes International Association (MIa), now a Foundation (MICu), in collaboration with James Sacchettini (Texas A&M), Denis Broun (MICu), Yusuf Hamied (CIPLA) and Francesc Palau from Hospital Sant Joan de Déu (HSJD).

It was supported by a large number of experts from different fields, including pediatricians, biochemists, geneticists, pharmacometrists, lawyers, and lobbyists. The science-related experts were grouped into the Copperless Committee, the MICu's scientific advisory board. Their goal was to facilitate this exceptional treatment with the support of the Spanish Agency for Medicines and Health Products (AEMPS).

KEY MILESTONES OF NPP-MENKES OF MENKES INTERNATIONAL

2020

May 2020:
Publication of the paper on Es-Cu in Science Magazine following research of V. Gohil and J. Sacchettini.

November 2020:
Foundation of Menkes International by A.Mateos, MJ.Portillo and JV.Mateos.

December 2020:
Set up of the 3 working groups (pharma, legal and clinical) for the NPP led by A.Mateos and generally adviced by J. Sacchettini, F. Palau and L. Cervera-Navas.

2021

May 2021:
Establishment of the Copperless Committee, serving as MICu's Scientific Advisory Board led by F.Palau, where the therapeutic protocol drafted by M.Petris &C. Papageorgiou and calculated by J. Standing and V.Mangas, for the first patient after extensive discussions of the Committee was adopted.

June 2021:
Bridge Bio and the Sacchettini lab provided information on the Es-Cu formulation and compounding.

September 2021:
Following D. Broun´s work, synthesis of the ES-Cu molecule by Yusuf Hamied (CIPLA), which was then donated to MICu and deposited at HSJD

October 2021:
Clearance granted by the HSJD Clinical Ethics Committee to initiate treatment for the first child.

October 2021:
Approval from the AEMPS for the treatment of the first child, following a proposal from HSJD's Pharmacy Department.

December 2021:
Formulation of ES-Cu in the HSJD Pharmacy (by Miquel Villaronga), with the advice of CIPLA (Purandare) and James Sacchettini.

2022

January 2022:
Administration of the first dose of ES-Cu on January 30, 2022, and initiation of the clinical study protocol led by Dr. Palau's team at HSJD.

2025

July 2025:
First study showing the efficacy of ES-Cu in two children with Menkes disease was published in the Journal of Clinical Investigation.

2026

January 2026:
Following the authorizations of the Spanish Medicament Agency and Medical Devices (AEMPS) and Swiss Agency for Therapeutic Products (Swissmedic), nine children treated with Es-Cu in Spain and Switzerland.

EXTENSION OF THE EXPERIMENTAL TREATMENT

After observing the effectiveness and safety of the treatment with the ES-Cu plus Cu-histidine (Cu-His) regimen, the possibility of treating additional children was explored at the request of their local attending physicians. Building on this experience, new patients have since been added to the NPP-Menkes. The treatment results for the first two children were published in 2025 (Godoy-Molina et al., 2025; Gohil et al. 2025).

Menkes International, along with its Copperless Committee, provides scientific and medical support and coordinates NPP-Menkes to facilitate information exchange related to potential named-patient access to an exceptional ES-Cu–based treatment for Menkes disease, in accordance with national regulations. As of February 2026, there are currently nine patients being treated in Spain (7) and Switzerland (2) under the NPP-Menkes program.

HOW DOES IT WORK?

The family and the patient´s medical team will formally request MICu the incorporation of the patient into the NPP-Menkes. Upon receipt of the notification, MICu will forward it to its Scientific Advisory Body (SAB), the Copperless Committee, on a case-by-case basis. The local treating physician and hospital of a potential Menkes patient initiate access to treatment through a request, which is subject to prior authorisation by the ad hoc ethical committee and the competent national authority. The scientific aspects are examined by the Copperless Committee, while clinical management depends on the patients´attending physician, assisted by the MICu pharmaco-clinical team, called the Core, which reports to the Copperless Committee.

All clinical decisions, including dosing, treatment administration, monitoring, and pharmacovigilance, remain the exclusive responsibility of the local treating physician and hospital, in accordance with applicable national legislation.

Once the medical team of the patient obtains the authorization to proceed with the treatment, Menkes International provides the treatment **free of charge**

SERVICES PROVIDED BY MENKES INTERNATIONAL

1

Collaboration with authorized stakeholders.

2

Active Pharmaceutical Ingredient *(API)*: Donation of the API (not ready-to-use).

3

Formulations: Facilitation of contact with authorized hospitals experienced in the hospital-based preparation of ready-to-use subcutaneous formulations, where locally permitted (eg, within the EU).

4

Dosing & protocols: Scientific advice on dosing criteria and treatment approaches, provided by the Copperless Committee, at the request of the of the local treating physician and hospital.

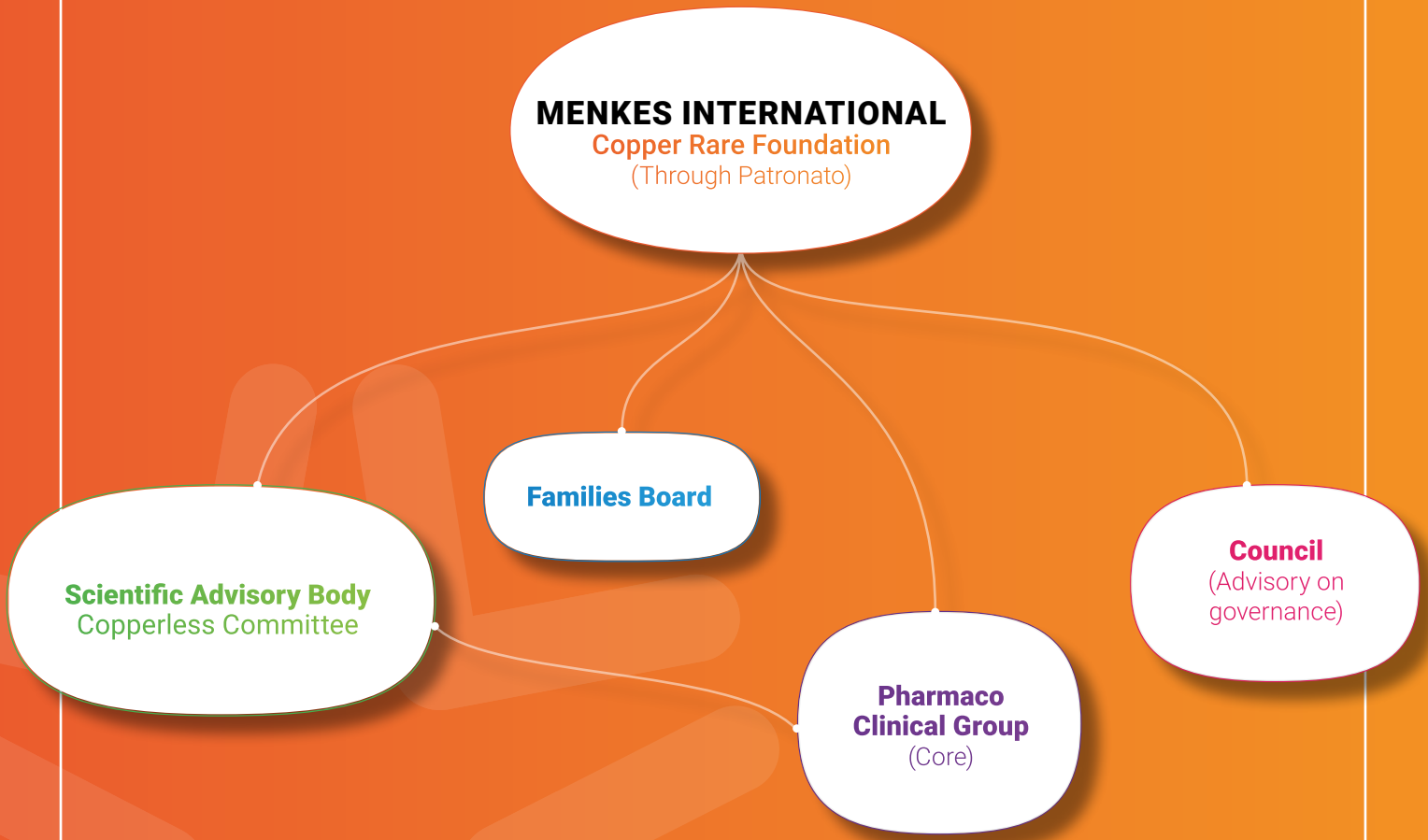
5

Scientific support and clinical advice: provided to the attending physicians by the Copperless Committee and the Core Team (medical and pharmacological team of MICu).

6

Support to families: by the Menkes International families Committee.

STRUCTURE


MENKES INTERNATIONAL
Copper Rare Foundation
(Through Patronato)
Families Board
Scientific Advisory Body
Copperless Committee
Pharmaco
Clinical Group
(Core)
Council
(Advisory on
governance)

TEN STEPS FOR ACCESSING THE MENKES NAMED-PATIENTS PROGRAM (NPP-MENKES) OF MENKES INTERNATIONAL WITH ELESCLOMOL-COPPER

TEN STEPS FOR ACCESSING THE MENKES NAMED-PATIENTS PROGRAM (NPP-MENKES) OF MENKES INTERNATIONAL WITH ELESCLOMOL-COPPER

1

FORMAL REQUEST TO MICu BY THE PATIENT´S FAMILY AND MEDICAL TEAM

The attending physician: supported by the hospital services, evaluates the clinical situation and, if considered appropriate, initiates a named-patient request in accordance with the applicable national procedure.

Patient families: provide informed consent prior to treatment initiation.

MICu: Upon request by the medical team, MICu addresses the query to its Scientific Advisory Body (Copperless Committee) and its pharmaco-clinical group (the Core) to provide scientific or technical information to support potential access pathway.

2

APPROVAL BY THE AD HOC ETHICS COMMITTEE

The Ethics Committee at the patient's hospital or other relevant ethics body must approve the **NPP-Menkes** for its patient. Review by a **local Ethics Committee** may be required in accordance with hospital policies or national requirements, depending on the country and institutional framework. **MICu** delegates all the ethical aspects of the NPP to this committee.

3

AUTHORIZATION BY THE NATIONAL MEDICINES AGENCY

The named-patient request for treatment is formally submitted by the local treating hospital (typically through the Hospital Pharmacy Department) to the competent national authority, which evaluates and authorizes the request under the conditions it deems appropriate. In Spain, this authorization is granted by the **Spanish Medicines and Health Products Agency** (Agencia Española de Medicamentos y Productos Sanitarios – AEMPS). All authorized conditions apply exclusively to the individual patient and do not constitute a general or programmatic authorization. The NPP-Menkes is subject to all conditions extended by the ad hoc National Medicines Agency.

TEN STEPS FOR ACCESSING THE MENKES NAMED-PATIENTS PROGRAM (NPP-MENKES) OF MENKES INTERNATIONAL WITH ELESCLOMOL-COPPER

FORMULATION ARRANGEMENTS

The **ES-Cu** is initially in powder form. **MICu** provides this active pharmaceutical ingredient (API). It must be formulated before being administered to the patient. The medicinal product is dispensed either as API or ready-to-use through duly authorized channels, in accordance with national legislation and the conditions established by the competent authority. This access pathway applies globally, both within and outside the European Union.

While the regulatory process, administrative requirements, and timelines may vary depending on whether a country is part of the EU or has regulatory agreements with it, **authorization from AEMPS is required for the export of the ES-Cu formulation**. National Medicines Agency authorization is needed for its import. The formulating pharmacy is responsible for the verification process and quality standards of the formulation.

4

- **Inside the EU**: Access to ES-Cu treatment is primarily based on the supply of a ready-to-use subcutaneous formulation, and subject to case-by-case evaluation and authorization by the competent national regulatory authorities.
- **Outside the EU**: only if authorized by the competent authority, local preparation of the medicinal product may be considered by a duly authorized hospital pharmacy, in compliance with all applicable regulatory and quality requirements.

5

SHIPPING

Inside the EU: The formulating **pharmacy hospital in Spain** that cooperates with **MICu** (eg. Hospital of León -Rubén Varela- or Hospital Sant Joan de Deu -Ángela Pieras-), after completion of all necessary legal procedures, will ship the **ready-to-use drug at 5 degrees Celsius**.

TEN STEPS FOR ACCESSING THE MENKES NAMED-PATIENTS PROGRAM (NPP-MENKES) OF MENKES INTERNATIONAL WITH ELESCLOMOL-COPPER

6

BASAL TESTS

Since this is a new treatment, ensuring the highest level of **therapeutic safety** for patients and their families is crucial. Therefore, the **clinical team** will administer the treatment with scientific support and therapeutic guidance from both the **Copperless Committee** and the **Core Team**.

7

TRAINING OF THE PATIENT MEDICAL TEAM

The Core Team members will conduct an **on-site visit** to examine the patient and advise the **medical team**, including the patient´s **physiotherapist**. The Core will deliver a short presentation on how the **NPP** works.
At the local treating hospital's request, members of **MICu** subsidiary advisory groups may provide information and engage in **scientific exchange**, either remotely or during institutional meetings, to support an understanding of the **disease context** and previously reported experiences.

8

DOSING PLAN

The Copperless Committee will propose an **individualized dosing plan** tailored to the patient's clinical situation and characteristics. The Copperless Committee will discuss the individualized dosing plan proposed by the Committee's pharmacometrists. The adopted dosing plan will be shared with the **attending physician** and the **family**, who will make the final decision regarding initiation, continuation, and discontinuation of the treatment.
Following the Committee's recommendations, **dosing decisions** are the exclusive responsibility of the **attending physician**, who determines the individual treatment plan based on the patient's clinical condition, local practice, and the conditions authorized by the competent national authority.

TEN STEPS FOR ACCESSING THE MENKES NAMED-PATIENTS PROGRAM (NPP-MENKES) OF MENKES INTERNATIONAL WITH ELESCLOMOL-COPPER

9

BEGINNING THE NPP

Before treatment initiation, the patient's **family** signs two documents that reflect the uncertainty of benefits and the unknown risks of the treatment: an informed consent form and liability release agreement, in accordance with applicable national legislation and hospital procedures. Families may agree to data sharing for follow-up purposes. Once treatment has started, clinical monitoring, follow-up, and pharmacovigilance are performed by the **local medical team** and the treating hospital.
At the request of the treating team, **MICu** subsidiary bodies, the **Core Team**, and **Copperless Committee**, may facilitate information exchange, provided that all data shared are handled in compliance with applicable data protection and confidentiality requirements. The Copperless Committee will conduct regular assessment of the ongoing treatment and will give suggestions to the **local physician** through the Core. The treating physician will keep the **family** informed.
Since the start, the medical team and families will be contacted around once a week and will be invited to contact the Core if needed.

10

INFORMATION-SHARING

The Copperless Committee will propose an individualized dosing plan tailored to the patient. The medical teams may be invited to participate in scientific or educational exchanges with advisory groups voluntarily to discuss general experiences and emerging knowledge. All patient data, freely shared by the family's patients or on their behalf, will be stored in the **MICu repository**. This data will be accessible to researchers and members of the **Copperless Committee** after following the internal clearance procedure. All information will be anonymized and managed in accordance with the **EU General Data Protection Regulation** (GDPR) framework.

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Making Menkes disease history

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