# Actividad de la GENIB:
# Rendimiento diagnóstico en las Illes Balears

## II Jornada de la Estrategia de Enfermedades Minoritarias de las Illes Balears

**23 de mayo de 2024**

**Dr. Víctor J. Asensio**

Unidad de Diagnóstico Molecular y Genética Clínica
Unidad de Genética y Genómica de las Islas Baleares-GENIB
Hospital Universitario Son Espases

# Unidad de Diagnóstico Molecular y Genética Clínica.

UNIDAD DE SECUENCIACIÓN (Sanger)

Exoma clínico 7.000 genes

Exoma completo 20.000 genes

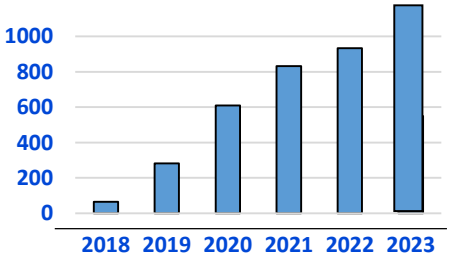
PGx
NIPT

GENIB

2018 | 2019 | 2020 | 2021 | 2022 | 2023

UNIDAD DE GENÉTICA

Estudios anuales de NGS





WGS
RNAseq

# Actualización en Enfermedades Minoritarias

Informe ReeR 2023:
Situación de las
Enfermedades Raras
en España

Diciembre 2023

ReeR
Registro estatal de enfermedades Raras

GOBIERNO DE ESPAÑA · MINISTERIO DE SANIDAD

**24 entidades clínicas**

1. **Ataxia de Friedreich:**
2. **Atrofia Muscular Espinal Proximal:**
3. **Complejo Esclerosis Tuberosa:**
4. **Displasia Renal:**
5. **Distrofia Miotónica de Steinert:**
6. **Enfermedad de Fabry:**
7. **Enfermedad de Gaucher:**
8. **Enfermedad de Huntington:**
9. **Enfermedad de Niemann Pick:**
10. **Enfermedad de Rendu Osler:**
11. **Enfermedad de Wilson:**
12. **Esclerosis Lateral Amiotrófica:**
13. **Fenilcetonuria:**
14. **Fibrosis Quística:**
15. **Hemofilia A:**
16. **Osteogénesis Imperfecta:**
17. **Retinosis pigmentaria:**
18. **Síndrome de Angelman:**
19. **Síndrome de Beckwith Wiedemann:**
20. **Síndrome de Goodpasture:**
21. **Síndrome de Marfan:**
22. **Síndrome de Prader Willi:**
23. **Síndrome de Williams:**
24. **Síndrome de X Frágil:**

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GOBIERNO DE ESPAÑA · MINISTERIO DE SANIDAD

**24 entidades clínicas**

**30 genes**

| | | |
|---|---|---|
| 1. | Ataxia de Friedreich: | FXN |
| 2. | Atrofia Muscular Espinal Proximal: | SMN1 |
| 3. | Complejo Esclerosis Tuberosa: | TSC1, TSC2 |
| 4. | Displasia Renal: | PAX2, HNF1B, EYA1 |
| 5. | Distrofia Miotónica de Steinert: | DMPK |
| 6. | Enfermedad de Fabry: | GLA |
| 7. | Enfermedad de Gaucher: | GBA |
| 8. | Enfermedad de Huntington: | HTT |
| 9. | Enfermedad de Niemann Pick: | SMPD1, NPC1, NPC2 |
| 10. | Enfermedad de Rendu Osler: | ENG, ACVRL1, SMAD4 |
| 11. | Enfermedad de Wilson: | ATP7B |
| 12. | Esclerosis Lateral Amiotrófica: | SOD1, C9orf72, TARDBP, FUS |
| 13. | Fenilcetonuria: | PAH |
| 14. | Fibrosis Quística: | CFTR |
| 15. | Hemofilia A: | F8 |
| 16. | Osteogénesis Imperfecta: | COL1A1, COL1A2 |
| 17. | Retinosis pigmentaria: | RHO, USH2A, RPGR… |
| 18. | Síndrome de Angelman: | UBE3A |
| 19. | Síndrome de Beckwith Wiedemann: | CDKN1C, H19, KCNQ1OT1 |
| 20. | Síndrome de Goodpasture: | COL4A3, COL4A4 |
| 21. | Síndrome de Marfan: | FBN1 |
| 22. | Síndrome de Prader Willi: | 15q11-q13 |
| 23. | Síndrome de Williams: | 7q11.23 |
| 24. | Síndrome de X Frágil: | FMR1 |

# Osteogenesis Imperfecta: Clinical Diagnosis, Nomenclature and Severity Assessment

**F.S. Van Dijk,[1] and D.O. Sillence[2]***

[1]Department of Clinical Genetics, Center for Connective Tissue Disorders, VU University Medical Center, Amsterdam, The Netherlands

[2]Discipline of Genetic Medicine, The Children's Hospital at Westmead Clinical School, Sydney Medical School, University of Sydney, Head Connective Tissue Dysplasia Management Service, The Children's Hospital at Westmead, Sydney, Australia

Manuscript Received: 31 October 2013; Manuscript Accepted: 12 February 2014

TABLE I. A New OI Nomenclature Combined With Causative Genes (A) Phenotypes With Mild to Moderate Severity, (B) Progressively Deforming and Perinatally Lethal Phenotypes

| OI syndrome names | Type | Gene | MIM | Locus | Protein product | Inheritance |
|---|---|---|---|---|---|---|
| (A) | | | | | | |
| Non-deforming OI with blue sclerae | 1 | 1. *COL1A1* | #166200 | 17q21.33 | Collagen alpha-1(I) chain | AD |
| | | 2. *COL1A2* | #166200 | 7q22.3 | Collagen alpha-2(I) chain | AD |
| Common variable OI with normal sclerae | 4 | 1. *COL1A1* | #166220 | 17q21.33 | Collagen alpha-1(I) chain | AD |
| | | 2. *COL1A2* | #166220 | 7q22.3 | Collagen alpha-2(I) chain | AD |
| | | 3. *WNT1*[a] | #615220 | 12q13.12 | Wingless-type MMTV integration site family, member 1 | AD |
| | | | | | Cartilage-associated protein (CRTAP) | |
| | | 1. *CRTAP* | #610682 | 3p22.3 | Cyclophilin B (CyPB) | AR |
| | | 2. *PPIB* | #259440 | 15q22.31 | Osterix | AR |
| | | 3. *SP7* | #613849 | 12q13.13 | Plastin 3 | AR |
| | | 1. *PLS3* | | Xq23 | | XL |
| OI with calcification in interosseous membranes | 5 | 1. *IFITM5* | #610967 | 11p15.5 | Interferon-induced transmembrane protein 5 | AD |
| (B) | | | | | | |
| Progressively deforming | 3 | 1. *COL1A1* | #259420 | 17q21.33 | Collagen alpha-1(I) chain | AD |
| | | 2. *COL1A2* | #259420 | 7q22.3 | Collagen alpha-2(I) chain | AD |
| | | 1. *BMP1* | #614856 | 8p21.3 | Bonemorphogeneticprotein 1 | AR |
| | | 2. *CRTAP* | #610682 | 3p22.3 | Cartilage-associatedprotein (CRTAP) | AR |
| | | 3. *FKBP10* | #610968 | 17q21.2 | Peptidyl-prolyl cis-transisomerase FKBP10 | AR |
| | | 4. *LEPRE1* | #610915 | 1p34.2 | Prolyl 3-hydroxylase 1 (P3H1) | AR |
| | | 5. *PLOD2* | #609220 | 3q24 | Procollagen-lysine, 2-oxoglutarate | AR |
| | | 6. *PPIB* | #259440 | 15q22.31 | 5-dioxygenase 2 | AR |
| | | 7. *SERPINF1* | #613982 | 17p13.3 | Cyclophilin B (CyPB) | AR |
| | | 8. *SERPINH1* | #613848 | 11q13.5 | Pigment-epithelium-derived factor (PEDF) | AR |
| | | 9. *TMEM38B* | #615066 | 9q31.1 | Heat shock protein 47 (HSP47) | AR |
| | | 10.*WNT1* | #615220 | 12q13.12 | Trimeric intracellular cation channel B (TRIC-B) | AR |
| | | 11.*CREB3L1* | | 11q11 | Wingless-type MMTV integration site family, member 1 | AR |
| | | | | | Old Astrocyte | AR |
| | | | | | Specifically induced substance (OASIS) | |
| Perinatally lethal OI | 2[b] | 1. *COL1A1* | #166220 | 17q21.33 | Collagen alpha-1(I) chain | AD |
| | | 2. *COL1A2* | #166220 | 7q22.3 | Collagen alpha-2(I) chain | AD |
| | | 1. *CRTAP* | #610682 | 3p22.3 | Cartilage-associated protein (CRTAP) | AR |
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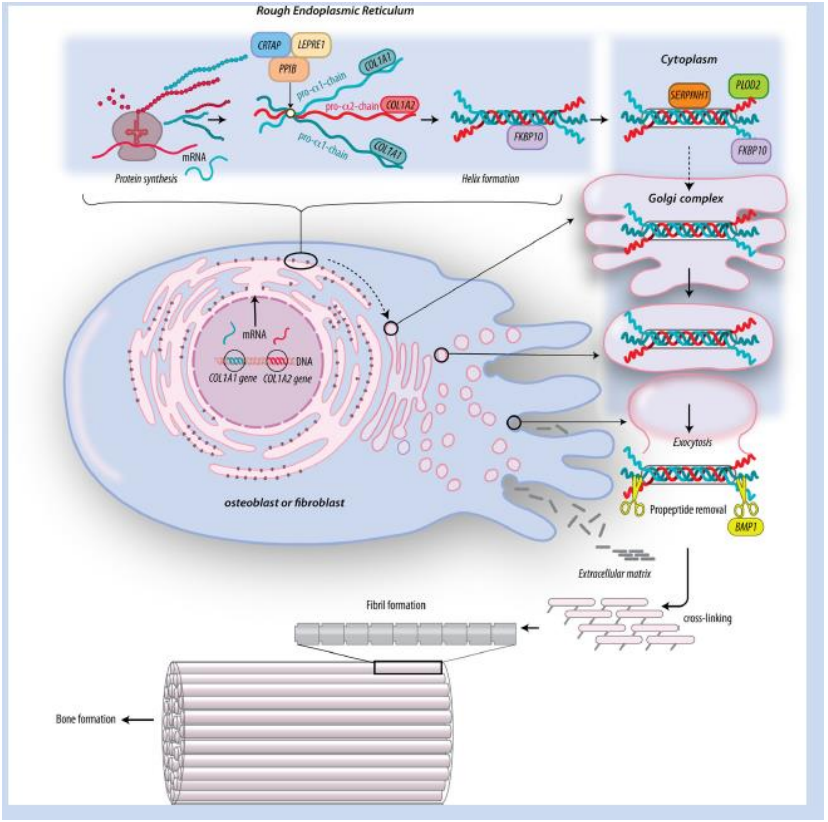
| | | 3. *PPIB* | #259440 | 15q22.31 | Cyclophilin B (CyPB) | AR |



# Actualización en Enfermedades Minoritarias

## Osteogenesis Imperfecta: Clinical Diagnosis, Nomenclature and Severity Assessment

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[1]Department of Clinical Genetics, Center for Connective Tissue Disorders, VU University Medical Center, Amsterdam, The Netherlands

[2]Discipline of Genetic Medicine, The Children's Hospital at Westmead Clinical School, Sydney Medical School, University of Sydney, Head Connective Tissue Dysplasia Management Service, The Children's Hospital at Westmead, Sydney, Australia

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| | | 3. *WNT1*[a] | #615220 | 12q13.12 | Wingless-type MMTV integration site family, member 1 | AD |
| | | | | | Cartilage-associated protein (CRTAP) | |
| | | 1. *CRTAP* | #610682 | 3p22.3 | Cyclophilin B (CyPB) | AR |
| | | 2. *PPIB* | #259440 | 15q22.31 | Osterix | AR |
| | | 3. *SP7* | #613849 | 12q13.13 | Plastin 3 | AR |
| | | 1. *PLS3* | | Xq23 | | XL |
| OI with calcification in interosseous membranes | 5 | 1. *IFITM5* | #610967 | 11p15.5 | Interferon-induced transmembrane protein 5 | AD |
| (B) | | | | | | |
| Progressively deforming | 3 | 1. *COL1A1* | #259420 | 17q21.33 | Collagen alpha-1(I) chain | AD |
| | | 2. *COL1A2* | #259420 | 7q22.3 | Collagen alpha-2(I) chain | AD |
| | | 1. *BMP1* | #614856 | 8p21.3 | Bonemorphogeneticprotein 1 | AR |
| | | 2. *CRTAP* | #610682 | 3p22.3 | Cartilage-associatedprotein (CRTAP) | AR |
| | | 3. *FKBP10* | #610968 | 17q21.2 | Peptidyl-prolyl cis-transisomerase FKBP10 | AR |
| | | 4. *LEPRE1* | #610915 | 1p34.2 | Prolyl 3-hydroxylase 1 (P3H1) | AR |
| | | 5. *PLOD2* | #609220 | 3q24 | Procollagen-lysine, 2-oxoglutarate | AR |
| | | 6. *PPIB* | #259440 | 15q22.31 | 5-dioxygenase 2 | AR |
| | | 7. *SERPINF1* | #613982 | 17p13.3 | Cyclophilin B (CyPB) | AR |
| | | 8. *SERPINH1* | #613848 | 11q13.5 | Pigment-epithelium-derived factor (PEDF) | AR |
| | | 9. *TMEM38B* | #615066 | 9q31.1 | Heat shock protein 47 (HSP47) | AR |
| | | 10.*WNT1* | #615220 | 12q13.12 | Trimeric intracellular cation channel B (TRIC-B) | AR |
| | | 11.*CREB3L1* | | 11q11 | Wingless-type MMTV integration site family, member 1 | AR |
| | | | | | Old Astrocyte | AR |
| | | | | | Specifically induced substance (OASIS) | |
| Perinatally lethal OI | 2[b] | 1. *COL1A1* | #166220 | 17q21.33 | Collagen alpha-1(I) chain | AD |
| | | 2. *COL1A2* | #166220 | 7q22.3 | Collagen alpha-2(I) chain | AD |
| | | 1. *CRTAP* | #610682 | 3p22.3 | Cartilage-associated protein (CRTAP) | AR |
| | | 2. *LEPRE1* | #610915 | 1p34.2 | Prolyl 3-hydroxylase 1 (P3H1) | AR |
| | | 3. *PPIB* | #259440 | 15q22.31 | Cyclophilin B (CyPB) | AR |

Genomics england | GMS Panels | Panels | Genes and Entities

### Skeletal dysplasia (Version: 4.0)

There is a more recent signed-off version of this panel

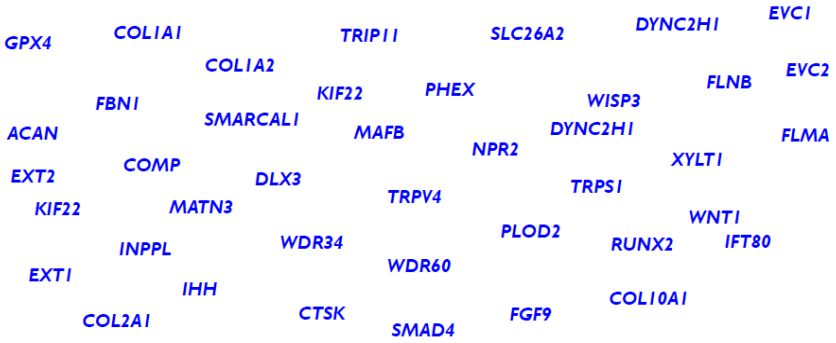
**Relevant disorders:** Unexplained skeletal dysplasia, Skeletal dysplasia, R104

**Signed off date:** 22 Mar 2023

**Panel types:** Rare Disease 100K, GMS Rare Disease Virtual, Component Of Super Panel, GMS signed-off

See this panel in PanelApp

418 green entities

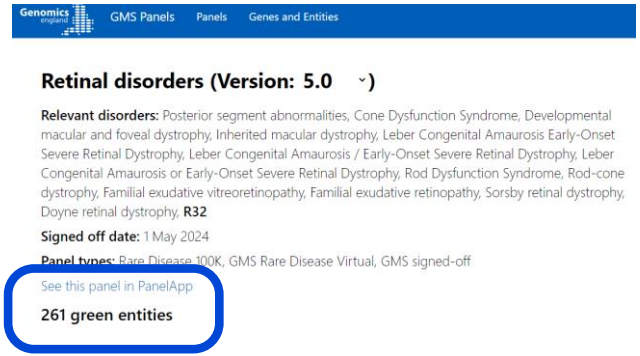


# Actualización en Enfermedades Minoritarias

| Enfermedad | Comunidad Autónoma o Ciudad con Estatuto de Autonomía de residencia | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Andalucía | Aragón | de | Balears, Illes | Canarias | Castilla y León | Catalunya | Comunitat Valenciana | Extremadura | Galicia | Madrid, Comunidad de | Melilla | Murcia, Región de | Navarra, Comunidad Foral de | País Vasco | Rioja, La | Total |
| Ataxia de Friedreich | 0,158 | 0,008 | 010 | 0,074 | 0,009 | 0,184 | 0,124 | 0,097 | 0,255 | 0,085 | 0,201 | | 0,159 | 0,243 | 0,073 | 0,063 | 0,134 |
| Atrofia muscular espinal proximal | 0,169 | 0,045 | 049 | 0,041 | 0,015 | 0,142 | 0,141 | 0,129 | 0,066 | 0,089 | 0,110 | | 0,218 | 0,152 | 0,046 | 0,000 | 0,125 |
| Complejo Esclerosis Tuberosa | 1,026 | 0,113 | 415 | 0,271 | 0,077 | 0,461 | 0,186 | 0,271 | 0,274 | 0,304 | 0,564 | | 0,416 | 0,684 | 0,361 | 0,190 | 0,470 |
| Displasia Renal | 0,808 | 0,105 | 304 | 0,254 | 0,039 | 0,239 | 0,120 | 0,333 | 0,406 | 0,271 | 0,671 | 0,119 | 0,443 | 0,578 | 0,009 | 0,127 | 0,414 |
| Distrofia miotónica de Steinert | 1,248 | 0,225 | 296 | 0,385 | 0,154 | 0,922 | 0,468 | 0,598 | 0,539 | 0,200 | 1,304 | | 0,925 | 3,041 | 1,189 | 1,771 | 0,856 |
| Enfermedad de Fabry | 0,199 | 0,035 | 049 | 0,115 | 0,027 | 0,054 | 0,096 | 0,105 | 0,028 | 0,096 | 0,093 | | 0,139 | 0,076 | 0,087 | 0,000 | 0,107 |
| Enfermedad de Gaucher | 0,094 | 0,195 | 049 | 0,025 | 0,027 | 0,054 | 0,048 | 0,038 | 0,039 | 0,056 | 0,049 | | 0,099 | 0,000 | 0,041 | 0,000 | 0,060 |
| Enfermedad de Huntington | 0,522 | 0,105 | 306 | 0,377 | 0,211 | 0,641 | 0,372 | 0,474 | 0,293 | 0,463 | 0,416 | 0,119 | 0,363 | 0,289 | 0,201 | 0,253 | 0,405 |
| Enfermedad de Niemann Pick | 0,020 | 0,000 | | 0,000 | 0,014 | 0,017 | 0,017 | 0,008 | | 0,033 | 0,013 | | 0,053 | 0,015 | 0,014 | 0,127 | 0,018 |
| Enfermedad de Rendu Osler | 0,315 | 0,068 | 148 | 0,320 | 0,237 | 0,444 | 0,358 | 0,279 | 0,312 | 0,248 | 0,383 | | 0,344 | 0,380 | 0,595 | 0,380 | 0,338 |
| Enfermedad de Wilson | 0,294 | 0,128 | 059 | 0,172 | 0,119 | 0,138 | 0,158 | 0,214 | 0,104 | 0,152 | 0,343 | | 0,423 | 0,411 | 0,156 | 0,095 | 0,214 |
| Esclerosis lateral amiotrófica | 0,660 | 0,308 | 968 | 0,418 | 0,239 | 0,763 | 0,544 | 0,333 | 0,444 | 0,308 | 0,639 | 0,119 | 0,423 | 0,745 | 0,197 | 0,664 | 0,497 |
| Fenilcetonuria | 0,385 | 0,218 | 237 | 0,361 | 0,215 | 0,293 | 0,387 | 0,194 | 0,217 | 0,541 | 0,450 | 0,119 | 0,403 | 0,258 | 0,133 | 0,032 | 0,320 |
| Fibrosis quística | 0,948 | 1,022 | 355 | 0,659 | 0,352 | 0,897 | 0,555 | 0,997 | 0,388 | 0,627 | 0,805 | 0,357 | 0,958 | 0,502 | 0,229 | 0,253 | 0,707 |
| Hemofilia A | 1,241 | 0,631 | 276 | 0,336 | 0,249 | 1,027 | 0,664 | 0,414 | 0,473 | 0,530 | 0,933 | 0,119 | 0,529 | 0,922 | 0,439 | 0,285 | 0,707 |
| Osteogénesis imperfecta | 0,510 | | 118 | 0,172 | 0,205 | 0,395 | 0,029 | 0,357 | 0,132 | 0,156 | 0,466 | 0,304 | 0,529 | 0,922 | 0,439 | 0,285 | 0,707 |
| Retinosis Pigmentaria y Retinosis Pigmentarias Sindrómicas | 2,239 | 0,008 | | 1,025 | 0,233 | 2,598 | 0,231 | 0,367 | 0,321 | 0,004 | 1,323 | | 2,234 | 0,836 | 1,578 | 0,063 | 1,071 |
| Síndrome de Angelman | 0,111 | 0,053 | 049 | 0,041 | 0,015 | 0,042 | 0,093 | 0,053 | 0,057 | 0,059 | 0,118 | | 0,099 | 0,213 | 0,037 | 0,000 | 0,083 |
| Síndrome de Beckwith Wiedemann | 0,141 | | | 0,000 | 0,018 | 0,013 | 0,043 | 0,028 | 0,057 | 0,019 | 0,108 | | 0,159 | 0,106 | 0,046 | 0,569 | 0,077 |
| Síndrome de Goodpasture | 0,173 | 0,008 | 049 | 0,036 | 0,013 | 0,067 | 0,052 | 0,057 | 0,132 | 0,030 | 0,176 | | 0,093 | 0,030 | 0,000 | 0,285 | 0,098 |
| Síndrome de Marfan | 0,648 | 0,218 | 217 | 0,172 | 0,215 | 0,423 | 0,139 | 0,376 | 0,151 | 0,178 | 0,662 | | 0,380 | 0,537 | 0,210 | 0,063 | 0,370 |
| Síndrome de Prader Willi | 0,363 | | 079 | 0,146 | 0,111 | 0,126 | 0,168 | 0,073 | 0,066 | 0,063 | 0,194 | | 0,152 | 0,228 | 0,055 | 0,190 | 0,177 |
| Síndrome de Williams | 0,162 | 0,000 | | 0,033 | 0,000 | 0,050 | 0,104 | 0,036 | 0,076 | 0,048 | 0,198 | | 0,238 | 0,182 | 0,046 | 0,000 | 0,114 |
| Síndrome de X Frágil | 0,426 | | 010 | 0,312 | 0,009 | 0,264 | 0,167 | 0,087 | 0,057 | 0,052 | 0,244 | 0,932 | 0,365 | 0,311 | 0,190 | 0,244 | |

Prevalencia puntual a 1 de enero de 2021 por Comunidad Autónoma de residencia. Prevalencia por cada 10.000 habitantes, estimada según casos reportados en 2023.

Retinosis Pigmentaria y Retinosis Pigmentarias Sindrómicas 1,025



# Actualización en Enfermedades Minoritarias

| Enfermedad | Comunidad Autónoma o Ciudad con Estatuto de Autonomía de residencia | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Andalucía | Aragón | Asturias, Principado de | Balears, Illes | Canarias | Castilla y León | Catalunya | Comunitat Valenciana | Extremadura | Galicia | Madrid, Comunidad de | Melilla | Murcia, Región de | Navarra, Comunidad Foral de | País Vasco | Rioja, La | Total |
| Ataxia de Friedreich | 0,158 | 0,008 | 0,010 | 0,074 | 0,009 | 0,184 | 0,124 | 0,097 | 0,255 | 0,085 | 0,201 | | 0,159 | 0,243 | 0,073 | 0,063 | 0,134 |
| Atrofia muscular espinal proximal | 0,169 | 0,045 | 0,049 | 0,041 | 0,015 | 0,142 | 0,141 | 0,129 | 0,066 | 0,089 | 0,110 | | 0,218 | 0,152 | 0,046 | 0,000 | 0,125 |
| Complejo Esclerosis Tuberosa | 1,026 | 0,113 | 0,415 | 0,271 | 0,277 | 0,461 | 0,186 | 0,271 | 0,274 | 0,304 | 0,564 | | 0,416 | 0,684 | 0,361 | 0,190 | 0,470 |
| Displasia Renal | 0,808 | 0,105 | 0,504 | 0,254 | 0,259 | 0,239 | 0,120 | 0,333 | 0,406 | 0,271 | 0,671 | 0,119 | 0,443 | 0,578 | 0,009 | 0,127 | 0,414 |
| Distrofia miotónica de Steinert | 1,248 | 0,225 | 0,296 | 0,385 | 0,314 | 0,922 | 0,468 | 0,598 | 0,539 | 0,200 | 1,304 | | 0,925 | 3,041 | 1,189 | 1,771 | 0,856 |
| Enfermedad de Fabry | 0,199 | 0,035 | 0,049 | 0,115 | 0,017 | 0,054 | 0,096 | 0,105 | 0,028 | 0,096 | 0,093 | | 0,139 | 0,076 | 0,087 | 0,000 | 0,107 |
| Enfermedad de Gaucher | 0,094 | 0,195 | 0,049 | 0,025 | 0,017 | 0,054 | 0,048 | 0,038 | 0,039 | 0,056 | 0,049 | | 0,099 | 0,000 | 0,041 | 0,000 | 0,060 |
| Enfermedad de Huntington | 0,522 | 0,105 | 0,306 | 0,377 | 0,211 | 0,641 | 0,372 | 0,474 | 0,293 | 0,463 | 0,416 | 0,119 | 0,363 | 0,289 | 0,201 | 0,253 | 0,405 |
| Enfermedad de Niemann Pick | 0,020 | 0,000 | | 0,000 | 0,014 | 0,017 | 0,017 | 0,008 | | 0,033 | 0,013 | | 0,053 | 0,015 | 0,014 | 0,127 | 0,018 |
| Enfermedad de Rendu Osler | 0,315 | 0,068 | 0,148 | 0,320 | 0,217 | 0,444 | 0,358 | 0,279 | 0,312 | 0,248 | 0,383 | | 0,344 | 0,380 | 0,595 | 0,380 | 0,338 |
| Enfermedad de Wilson | 0,294 | 0,128 | 0,059 | 0,172 | 0,139 | 0,138 | 0,158 | 0,214 | 0,104 | 0,152 | 0,343 | | 0,423 | 0,411 | 0,156 | 0,095 | 0,214 |
| Esclerosis lateral amiotrófica | 0,660 | 0,308 | 0,968 | 0,418 | 0,239 | 0,763 | 0,544 | 0,333 | 0,444 | 0,308 | 0,639 | 0,119 | 0,423 | 0,745 | 0,197 | 0,664 | 0,497 |
| Fenilcetonuria | 0,385 | 0,218 | 0,237 | 0,361 | 0,215 | 0,293 | 0,387 | 0,194 | 0,217 | 0,541 | 0,450 | 0,119 | 0,403 | 0,258 | 0,133 | 0,032 | 0,320 |
| Fibrosis quística | 0,948 | 1,022 | 0,355 | 0,659 | 0,512 | 0,897 | 0,555 | 0,997 | 0,388 | 0,627 | 0,805 | 0,357 | 0,958 | 0,502 | 0,229 | 0,253 | 0,707 |
| Hemofilia A | 1,241 | 0,631 | 0,276 | 0,336 | 0,439 | 1,027 | 0,664 | 0,414 | 0,473 | 0,530 | 0,933 | 0,119 | 0,529 | 0,922 | 0,439 | 0,285 | 0,707 |
| Osteogénesis imperfecta | 0,510 | | 0,118 | 0,172 | 0,205 | 0,395 | 0,029 | 0,357 | 0,132 | 0,156 | 0,466 | 0,304 | 0,529 | 0,922 | 0,439 | 0,285 | 0,707 |
| Retinosis Pigmentaria y Retinosis Pigmentarias Sindrómicas | 2,239 | 0,008 | 1,025 | 0,172 | 0,205 | 2,598 | 0,231 | 0,367 | 0,321 | 0,004 | 1,323 | 0,304 | 2,234 | 0,836 | 1,578 | 0,063 | 1,071 |
| Síndrome de Angelman | 0,111 | 0,053 | 0,049 | 0,041 | 0,053 | 0,042 | 0,093 | 0,053 | 0,057 | 0,059 | 0,118 | 0,099 | 0,213 | 0,037 | 0,000 | 0,083 | |
| Síndrome de Beckwith Wiedemann | 0,141 | | | 0,000 | 0,008 | 0,013 | 0,043 | 0,028 | 0,057 | 0,019 | 0,108 | 0,159 | 0,106 | 0,046 | 0,569 | 0,077 | |
| Síndrome de Goodpasture | 0,173 | 0,008 | 0,049 | 0,036 | 0,053 | 0,067 | 0,052 | 0,057 | 0,132 | 0,038 | 0,176 | 0,093 | 0,030 | 0,000 | 0,285 | 0,098 | |
| Síndrome de Marfan | 0,648 | 0,218 | 0,217 | 0,172 | 0,215 | 0,423 | 0,139 | 0,376 | 0,151 | 0,178 | 0,662 | 0,380 | 0,537 | 0,210 | 0,063 | 0,370 | |
| Síndrome de Prader Willi | 0,363 | | 0,079 | 0,148 | 0,131 | 0,126 | 0,168 | 0,073 | 0,066 | 0,063 | 0,194 | 0,152 | 0,228 | 0,055 | 0,190 | 0,177 | |
| Síndrome de Williams | 0,162 | 0,000 | | 0,033 | 0,008 | 0,050 | 0,104 | 0,036 | 0,076 | 0,048 | 0,198 | 0,238 | 0,182 | 0,046 | 0,000 | 0,114 | |
| Síndrome de X Frágil | 0,426 | | 0,010 | 0,312 | 0,249 | 0,264 | 0,167 | 0,087 | 0,057 | 0,052 | 0,244 | 0,932 | 0,365 | 0,311 | 0,190 | 0,244 | |

Prevalencia puntual a 1 de enero de 2021 por Comunidad Autónoma de residencia. Prevalencia por cada 10.000 habitantes, estimada según casos reportados en 2023.

Retinosis Pigmentaria y Retinosis Pigmentarias Sindrómicas 1,025

**¿Qué pasa con las enfermedades ultra-raras?**

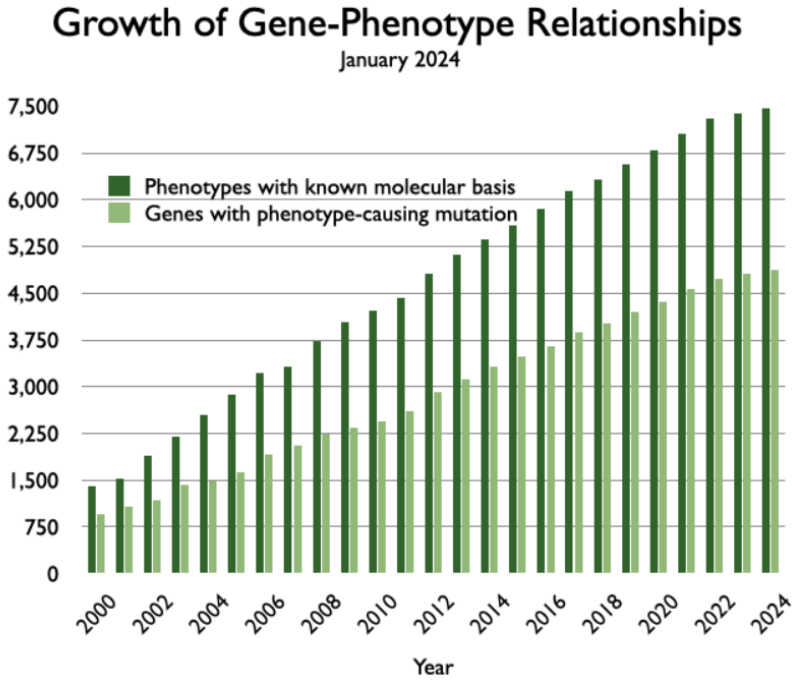
**¿Qué pasa con los otros pacientes?**

# OMIM® - Online Mendelian Inheritance in Man®

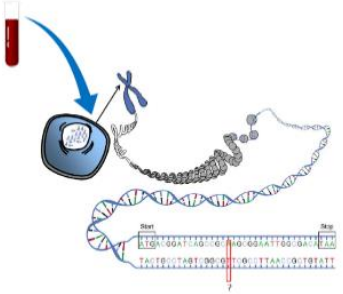
## OMIM Gene Map Statistics

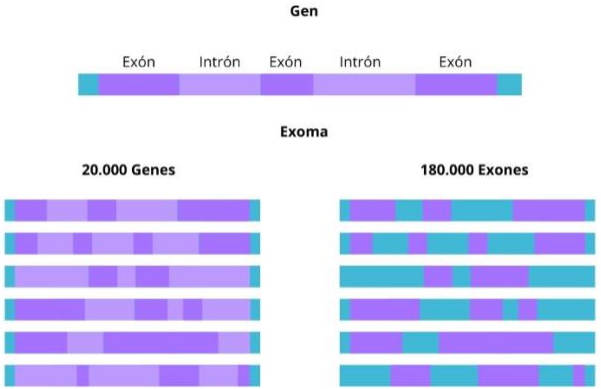
OMIM Morbid Map Scorecard (Updated May 17th, 2024) :

| | |
|---|---|
| **Total number of phenotypes* for which the molecular basis is known** | 7,529 |
| **Total number of genes with phenotype-causing mutation** | 4,909 |

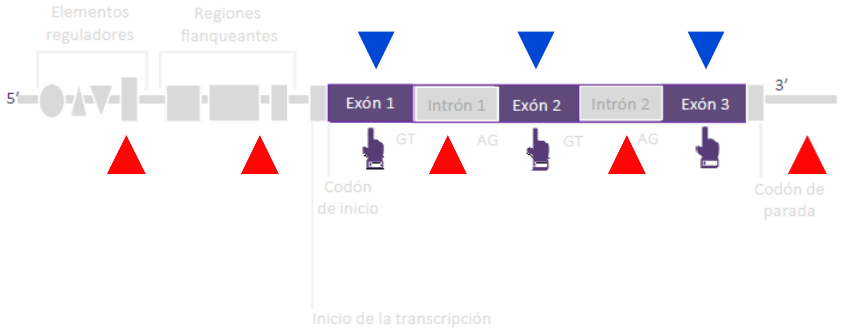



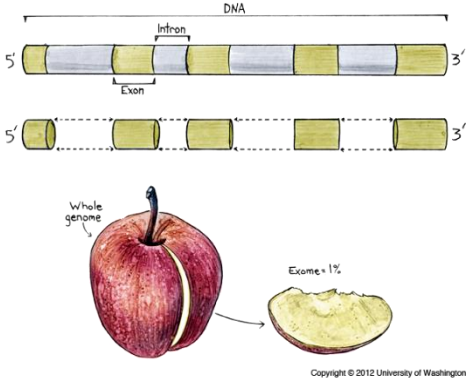
# Actualización en Enfermedades Minoritarias






## Estudio Exoma (WES)



# Actualización en Enfermedades Minoritarias

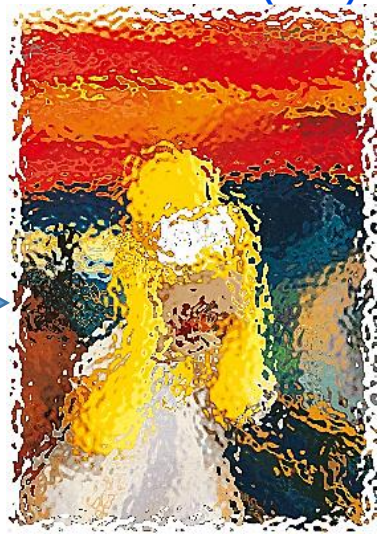
Pre-genómica

Genómica

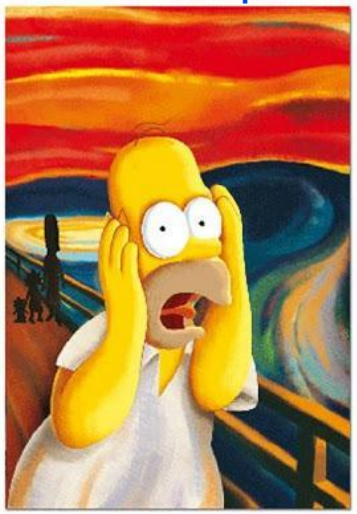
Conocimiento científico

Estudio individual gen a gen

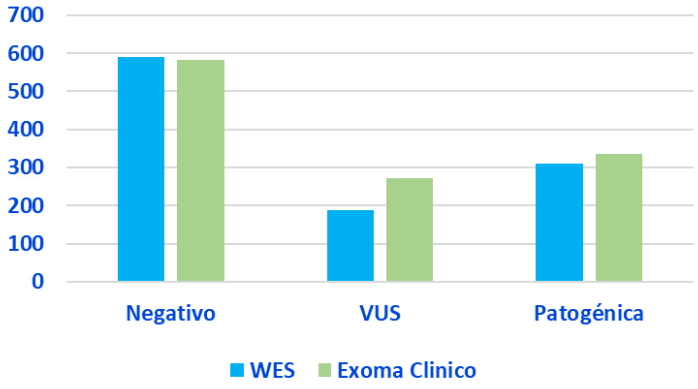
Estudio Exoma (WES)



Genoma completo

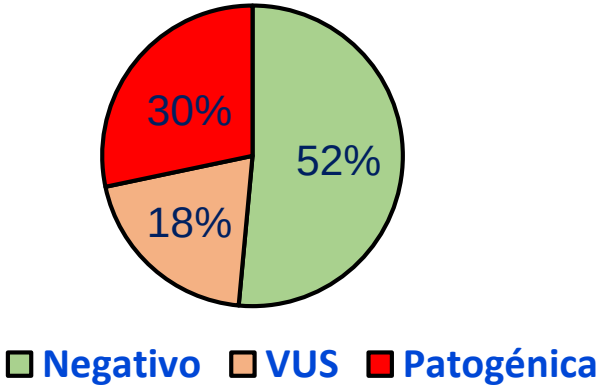


# Actividad de la GENIB: rendimiento diagnóstico en las Illes Balears

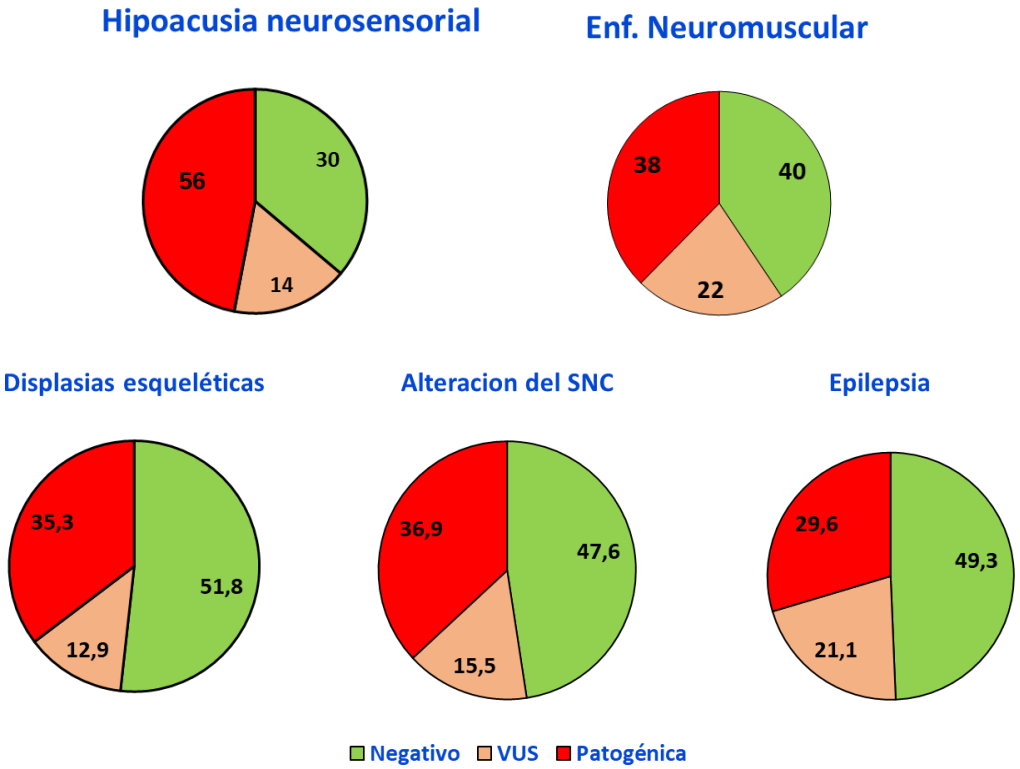



**Base de Datos genómicos**
**4000 secuencias**

**3300 PACIENTES NGS**



# Actividad de la GENIB: rendimiento diagnóstico en las Illes Balears



# Actividad de la GENIB: rendimiento diagnóstico en las Illes Balears

Genes (Basel). 2023 Mar 28;14(4):813. doi: 10.3390/genes14040813.

## Implementation of Exome Sequencing in Clinical Practice for Neurological Disorders

María Isabel Alvarez-Mora [1,2], Laia Rodríguez-Revenga [1,2], Meritxell Jodar [1,3], Miriam Potrony [1,2], Aurora Sanchez [1,2], Celia Badenas [1,2], Josep Oriola [1], José Luis Villanueva-Cañas [4], Esteban Muñoz [5], Francesc Valldeoriola [5], Ana Cámara [5], Yaroslau Compta [5], Mar Carreño [6], María Jose Martí [5], Raquel Sánchez-Valle [7,8], Irene Madrigal [1,2]

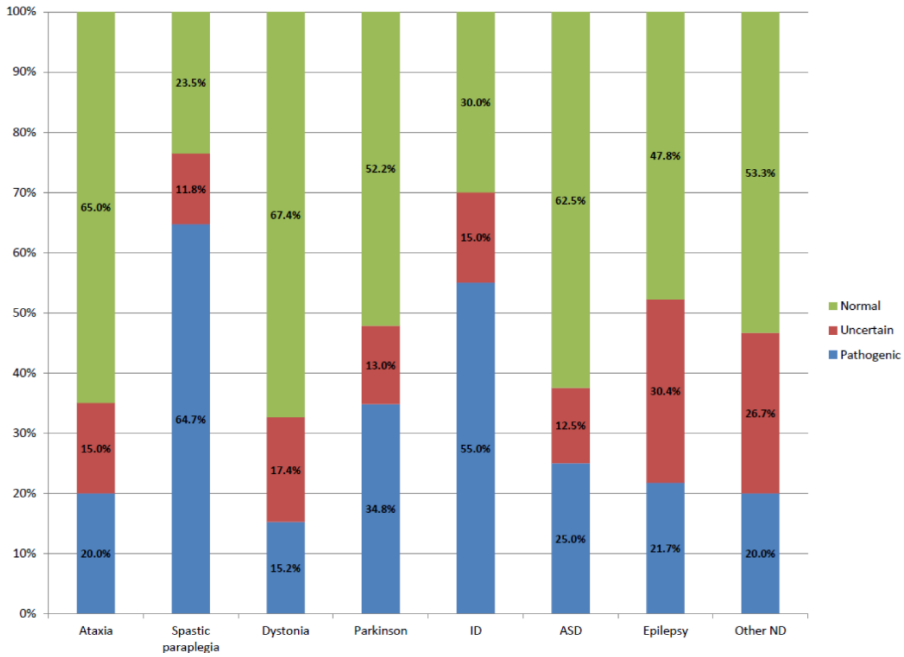
Affiliations + expand

PMID: 37107571 PMCID: PMC10137364 DOI: 10.3390/genes14040813

**Table 2.** Diagnostic yield in our cohort and other studies in patients with different neurological diseases.

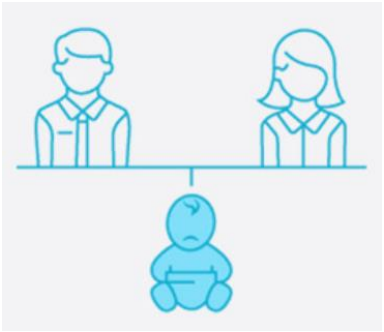
| Disease | Number of Patients Analyzed | Our Cohort % P/PP Variants | Other Reports % P/PP Variants |
|---|---|---|---|
| Movement disorders cohort | | | |
| Ataxia | 40 | 20% (8/40) | 13–52% [12,13,14,15,16] |
| Spastic paraplegia | 34 | 64.7% (22/34) | 40% [15] |
| Dystonia | 46 | 15.2% (7/46) | 8–37% [13,15,17,18] |
| Parkinson | 23 | 34.8% (8/23) | 11–14% [15,19] |
| Total | | 31.5% (45/143) | |
| Neurodevelopmental disorders cohort | | | |
| ID | 20 | 55% (11/20) | 22–48% [11,13,18,20] |
| ASD | 8 | 25% (2/8) | 9–21% [12,13,16,18,21] |
| Epilepsy | 23 | 21.7% (5/23) | 15–40% [12,13,16,18,22] |
| Total | | 35.3% (18/51) | |
| Other disorders | | | |
| Other | 15 | 20% (3/15) | |
| ALL COHORTS | 209 | 31.57% (66/209) | |

P: pathogenic; PP: probably pathogenic; ID: intellectual disability, ASD: autism spectrum disorder.



# Actividad de la GENIB: rendimiento diagnóstico en las Illes Balears

Novaseq 6000DX
2023



Exoma - Trio

**Agilidad del análisis NGS:**

* Descartar variantes dudosas mediante segregación en los progenitores.

*Detección de variantes *de novo.*

* Detección de variantes en heterozigosis compuesta

* Evita comprobación por Sanger en los progenitores.

**Permitiendo:**

* Análisis rápido.

* Informe concluyente (Informe Negativo)

# Actividad de la GENIB: rendimiento diagnóstico en las Illes Balears

Am J Hum Genet. 2023 Apr 6; 110(4): 681–690.
Published online 2023 Mar 29. doi: 10.1016/j.ajhg.2023.03.005
PMCID: PMC10119151
PMID: 36996813

## Bi-allelic variants in the *ESAM* tight-junction gene cause a neurodevelopmental disorder associated with fetal intracranial hemorrhage

Mauro Lecca,[1] Davut Pehlivan,[2,3,4] Damià Heine Suñer,[5,6] Karin Weiss,[7,8] Thibault Coste,[9,10] Markus Zweier,[11] Yavuz Oktay,[12,13,14] Nada Danial-Farran,[15] Vittorio Rosti,[16] Maria Paola Bonasoni,[17] Alessandro Malara,[1,18] Gianluca Contrò,[19] Roberta Zuntini,[19] Marzia Pollazzon,[19] Rosario Pascarella,[20] Alberto Neri,[21] Carlo Fusco,[22] Dana Marafi,[3,23] Tadahiro Mitani,[3] Jennifer Ellen Posey,[3] Sadik Etka Bayramoglu,[24] Alper Gezdirici,[25] Jessica Hernandez-Rodriguez,[6] Emilia Amengual Cladera,[6] Elena Miravet,[26] Jorge Roldan-Busto,[27] María Angeles Ruiz,[26] Cristofol Vives Bauzá,[28] Liat Ben-Sira,[29,30] Sabine Sigaudy,[31] Anaïs Begemann,[11] Sheila Unger,[32] Serdal Güngör,[33] Semra Hiz,[13,34] Ece Sonmezler,[12,13] Yoav Zehavi,[8,35] Michael Jerdev,[36] Alessandra Balduini,[1,37] Orsetta Zuffardi,[1] Rita Horvath,[38,39] Hanns Lochmüller,[40,41,42] Anita Rauch,[11,43] Livia Garavelli,[19] Elisabeth Tournier-Lasserve,[9,10] Ronen Spiegel,[8,35] James R. Lupski,[3,4,44,45] and Edoardo Errichiello[1,46,*]

▸ Author information ▸ Article notes ▸ Copyright and License information PMC Disclaimer

### Gene-Phenotype Relationships

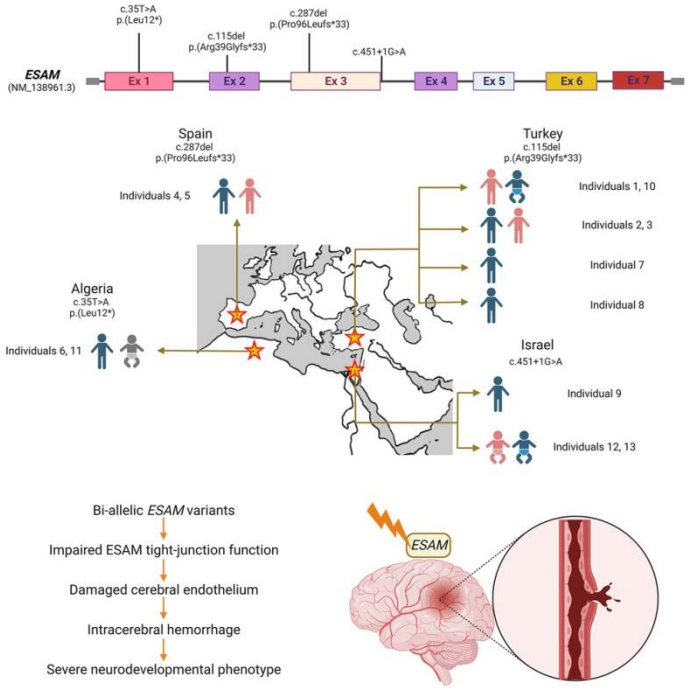
| Location | Phenotype | Phenotype MIM number | Inheritance | Phenotype mapping key |
|---|---|---|---|---|
| 11q24.2 | Neurodevelopmental disorder with intracranial hemorrhage, seizures, and spasticity | 620371 | AR | 3 |

PheneGene Graphics

### TEXT

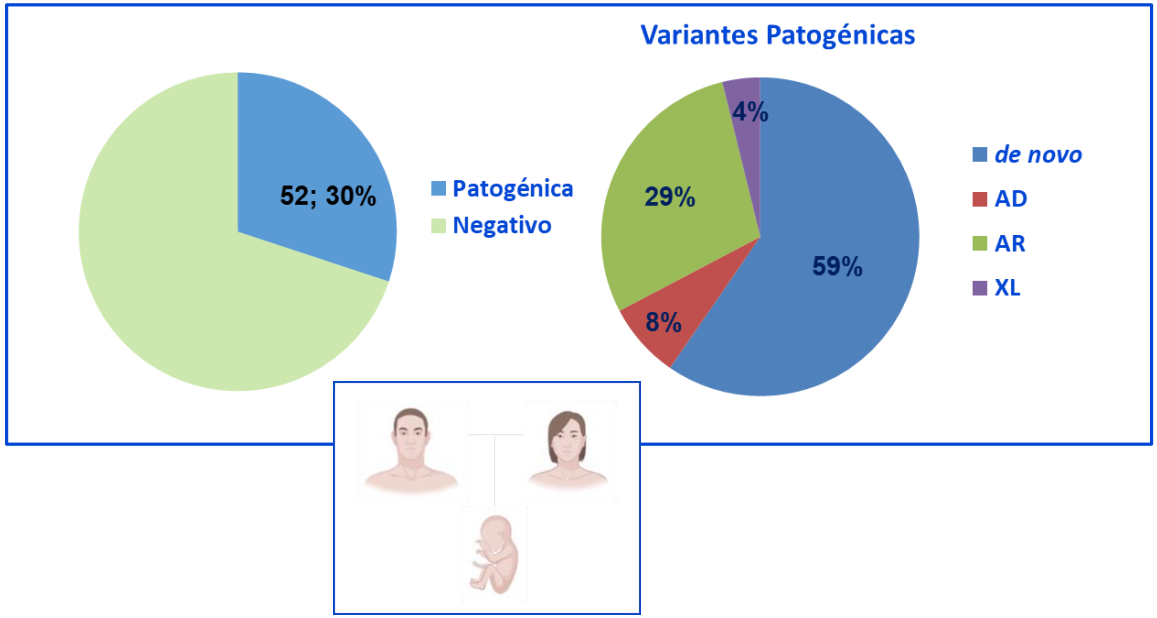
▾ **Description**

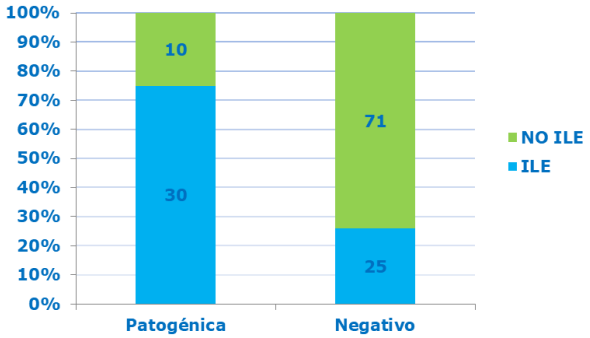
The ESAM gene encodes an endothelial cell-selective adhesion molecule that mediates homophilic interactions between endothelial cells. It is a member of the immunoglobulin receptor family (summary by Lecca et al., 2023).



# Prevención y Diagnóstico Precoz de Enfermedades Minoritarias

## Rendimiento global 173 estudios trio prenatales (2020-2023)



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hospital universitari

Govern de les Illes Balears
Conselleria de Salut

Conselleria de Salut
Direcció General de Prestacions, Farmàcia i Consum

ESTRATÈGIES DE SALUT ILLES BALEARS

# MUCHAS GRACIAS!


**Dr. Víctor J. Asensio**

Unidad de Diagnóstico Molecular y Genética Clínica
Unidad de Genética y Genómica de las Islas Baleares-GENIB
Hospital Universitario Son Espases