Zebrafish as a model organism for inherited bone marrow failure syndromes

Inherited bone marrow failure syndromes

- Fanconi anemia
- Diamond-Blackfan anemia
- Dyskeratosis congenita
- Shwachman-Diamond syndrome
- Congenital amegakaryocytic thrombocytopenia
- Severe congenital neutropenia

Model organism

Zebrafish

Advantages

- Rapid development of transparent embryos
- High fecundity → large numbers of mutant and transgenic lines
- Large collection of mutant and transgenic lines

Developmental hematopoiesis in zebrafish

ALM (myelopoiesis)
PLM (erythrocytes)
Hatching
AGM (HSC)

Circulation
hemangioblast

12 hpf
1 dpf

CHT (HSC, erythrocytes)
Thymus (T lymphocytes)
Kidney (HSC, erythrocytes, neutrophils, macrophages and B lymphocytes)

1 dpf
2.5 dpf
3 dpf
4 dpf
6 dpf

Primitive wave
Definitive wave

Oyarbide et al., Haematologica, 2019