

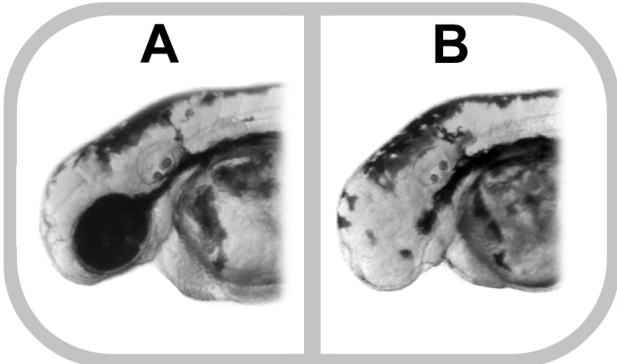
Spot the difference: zebrafish

Student worksheet



Can you spot the differences between the wildtype zebrafish and mutant zebrafish in the images below? Use the glossary to help you identify and correctly record the phenotypic changes.

1.



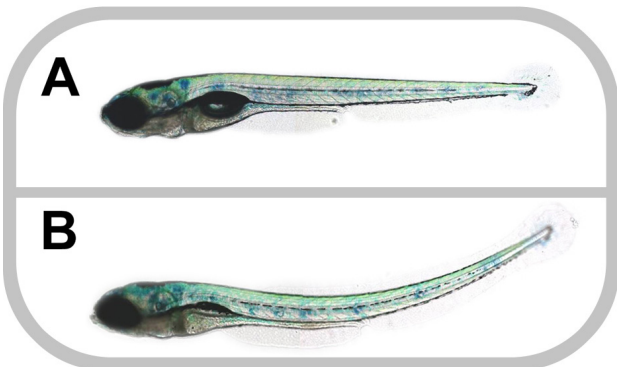
(Image: Rodrigo Young, University College London)

2.



(Image: Keith C. Cheng/ Penn State Pathology and Medicine)

3.



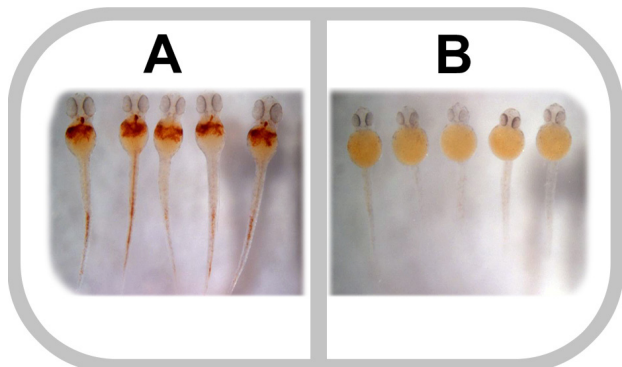
(Image: Elisabeth Busch, Wellcome Trust Sanger Institute)

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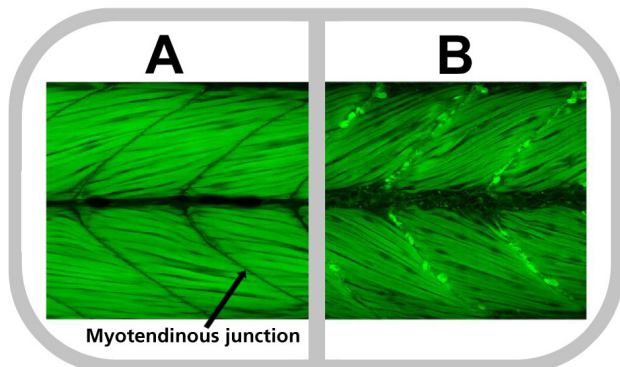


4.



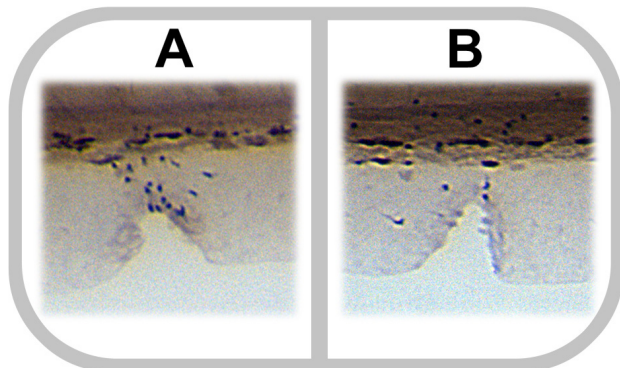
(Image: Ana Cvejic, Wellcome Trust Sanger Institute)

5.



(Image: Elisabeth Busch, Wellcome Trust Sanger Institute)

6.



(Image: Ana Cvejic, Wellcome Trust Sanger Institute)

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Glossary terms

Below are some scientific terms to aid you in your diagnosis of the phenotypic changes in the mutant zebrafish.

An ontology is a set of agreed scientific terms used to define phenotypes. This ensures that all researchers use the same terms to describe specific physical characteristics and phenotypes.

Term	Definition
Erythrocyte	Erythrocytes are also known as red blood cells. They transport oxygen to the body's tissues and contain a protein called haemoglobin that can bind to oxygen. It is the haemoglobin that gives the blood its red colour.
Melanosomes	Melanosomes are structures found in skin cells that contain a dark pigment called melanin. Melanin is responsible for skin colour. Higher amounts of melanin produce a darker skin whereas low amounts of melanin result in lighter skin colour.
Myotendinous junction	Myotendinous junctions are junctions formed by skeletal muscles where they join to tendons. These junctions play an important role in muscle function and strength.
Nebulin deficiency	Nebulin deficiency is a condition where the body does not produce a protein called nebulin. This is associated with the genetic disease nemaline myopathy. Nebulin deficiency is characterised by a build-up of muscle proteins, such as actin, in the muscle. Normally nebulin binds with actin. In the absence of nebulin, muscle tissue partially disintegrates leading to muscle weakness and a build up of actin in the muscle.
Nemaline myopathy	Nemaline myopathy is a genetic disease where muscle fibres do not form and function properly leading to poor muscle tone and weak muscles. Infants born with this condition show phenotypic characteristics such as: <ul style="list-style-type: none">• an open mouth as the muscles are too weak to keep the mouth closed• breathing and feeding problems• curvature of the spine (scoliosis).
Neutrophil	Neutrophils are a type of immune cell that play an important role in the immune systems response to infection or tissue damage. Neutrophils gather at the site of infection or damage causing swelling or inflammation. These neutrophils aid in the destruction of invading pathogens and clearing of damaged tissue cells.
Phenotype	A phenotype is an observable characteristic or trait. This can be a physical characteristic or feature such as skin colour, tail length or body shape. It can also be a characteristic such as behavior e.g. the inability to sleep.
Phenotypic change	A phenotypic change is a change in phenotype.