New method reduces need for fish in experiments

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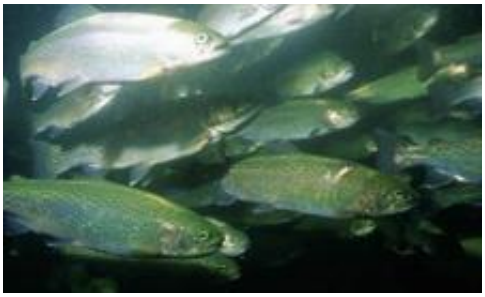

Fish are commonly used in experiments to identify environmental hazards and pollutants in water. As gills are in constant contact with the water, they are often the focal point for studies seeking to understand the effects of exposure to toxicants.

In a new study led by King's College London, researchers have validated a pioneering technique to recreate a freshwater gill system in the lab. This technique, published in the journal *Nature Protocols*, provides a more humane way to study the impacts of environmental hazards on freshwater fish, whilst reducing the number needed for experiments.

Professor Christer Hogstrand, Division of Diabetes and Nutritional Sciences, King's College London, said: "Whole-animal studies can use millions of fish worldwide each year, and therefore efforts are focusing

on refining, reducing and replacing (3Rs) these numbers."

In the study, researchers found that using just two fish can produce between 40-72 'mini gills'.

Dr Nic Bury from the Division of Diabetes and Nutritional Sciences at King's said: 'In this technique, gill cells from one fish are placed onto inserts and grown for a day. The next day, a second seed of gill cells from another fish are placed on top of the first seed – this is known as a double-seeded-insert technique (DSI).'

These 'mini gills' can be used as an alternative for toxicology testing, bioaccumulation studies and environmental water quality monitoring, as the researchers discovered that they can tolerate freshwater in the laboratory, as well as river water taken in the field.

Dr Bury added: 'The next step is to further develop this technique to extend its tolerance as the cell cultures can only withstand water exposure of up to 48 hours. By extending this period, the 'mini gills' could be used for longer-term studies.'

More information: Sabine Schnell et al. Procedures for the reconstruction, primary culture and experimental use of rainbow trout gill epithelia, *Nature Protocols* (2016). DOI: 10.1038/nprot.2016.029

Provided by King's College London