



ON THE TRAIL OF THE LOFOTEN WITH ARVED FUCHS

First use of the mobile stem cell lab

Fish and also mammalian or human cell cultures have many uses in biotechnology, medical engineering, or pharmaceuticals. Fish cells can be used as test systems to detect environmental toxins and thus replace animal experiments. They can be employed to study viral diseases and can, therefore, also be utilized to develop vaccines.

Cell cultures are furthermore the material archived in the German Cell Bank for Wildlife "Alfred Brehm" – CRYOBREHM, one of the most modern bioarchives worldwide. It was founded in cooperation with the Tierpark Hagenbeck and the Zoo Rostock. By collecting living cell cultures of wild animals "CRYOBREHM" preserves comprehensive biological information in live form. Therefore, this cell bank complements the traditional natural history archives by additional options for innovative scientific use.

To establish new cell cultures it is especially important that the starting material be fresh. A mobile laboratory, for example, on a truck, conveniently allows sample collection and processing directly on site, even in remote regions. Furthermore, different samples can be frozen and stored in a nitrogen tank included in the mobile lab.

In January 2013, the off-road-capable lab truck of the Fraunhofer Group for Life Sciences started for the first time for a test run under extreme conditions. This truck includes a completely equipped cell culture laboratory which makes it possible for the scientists to work completely independently

and to do their work in the most remote and exceptional places – right there where they collect the fresh samples.

In the middle of winter, this first trip was supposed to go to rough Norway. The aim of the journey was to test the truck with all its functions in a real environment. There were many questions: Would the installed equipment survive the long, arduous journey to the north of Europe? Will it be possible directly on site to take fresh samples, perform complete cell isolation and establish cell cultures? Can the samples be transported over long distances?

Aside from the logistic planning and equipping the truck with all additionally necessary media, solutions, and chemicals, preparation of the expedition also included completion and filing of the customs documents for the temporary import of goods to Norway. On January 5, 2013, the journey started. The truck was driven to Hirtshals (Denmark) and from there transferred by ferry to Bergen, from where it moved on to the Norwegian coast. In a small coastal town, the researchers obtained codfish from a fisherman. They isolated cells from several freshly removed organs and cultured these in the mobile lab. The lab truck was parked directly at the pier next to the fishing boat.

A highlight of the trip was the meeting with the polar explorer Arved Fuchs. He was traveling with his film team along the Norwegian coast at that time. In a documentary the adventurer follows the historical footsteps of the Lofoten fishermen. For centuries, they have been leaving around Christmas for northern Norway to catch the treasured cod there. Like many

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others, the fishermen in Norway can look back on an eventful history with the rise and fall of modern cod fishing. The Norwegians, however, have succeeded in preserving their stock by strict quota regulations and consistent action. Arved Fuchs is following a route where the cultural and economic importance of historical cod fishing is directly related to today's fishermen, spanning the gamut from traditional "wind-driven fishing" to a trendsetting way of acting.

The further development of molecular and cell biological technologies and establishment of cell cultures of as many important fish species as possible (such as codfish) opens up a large diversity of possibilities for sustainable stock management in the future.

On January 9, 2013, the successful isolation of cells from cod tissue was completed and the lab truck set out for Oslo through the mountainous roads of the Norwegian upcountry to return to Germany from there. Unfortunately, due to national regulations on the management of wild living marine resources, the isolated codfish cells were not allowed to be exported and had to be disposed of in Norway. This was another valuable experience for the planning of future expeditions. On January 11, 2013, the truck and the research team safely arrived back in Lübeck.

After this "baptism of fire" the mobile laboratory is now available for further projects. The Group is offering the use of this truck in cooperation with other research institutes, universities, or industry to support research and development on the road to the future.

Marina Gebert



Expert meeting in the mobile stem cell lab: polar explorer Arved Fuchs and Dr. Marina Gebert.