



EXCURSIONS AND OTHER NEWS

Small insights in student's or professor's points of view, field trips, and other stuff we do.

Getting Hormones Out of The Blood – Lab Rotation

Natalia Wulff

Hormones found in hair or blood tells scientists a lot about a person's wellbeing. Bodily materials like hair or blood contain steroid hormones. Analyzing them gives researchers information on diseases, stress levels or endocrine disorders. There are many methods, called biochemical assays, to extract hormones from the biological materials. During my lab rotation at Dresden Lab Service, a facility conducting hormone assays for researchers worldwide, I was initiated into the realm of this specialized work. Here, I learned to perform routine biochemical assays for steroid hormone analysis in saliva and hair samples. Steroid hormones are a group of hormones with a similar chemical structure, since they are all built from cholesterol. However, these hormones influence a range of different biological functions. Reproductive hormones such as estradiol and testosterone, as well as the stress hormone cortisol belong to the broad group of steroid hormones. In the process of my lab rotation, I was even able to generate my personal cortisol day profile or to retrospectively assess my stress level over the last 9 months using my hair strands. Once trained, I was participating in the development of an assay for steroid hormone analysis from filter-paper based dried blood spots. Working with dried blood spots has become increasingly popular over the last two decades and allows for easy sample collection, especially in newborns and animals. Given this background, we have performed different test series, e.g., with different elution methods and times, and we have further tested the stability of the investigated analytes including cortisol, testosterone, estradiol, and more. It was thoroughly interesting to be involved in this creative process of method development and I feel very glad to have been part of such a kind-hearted and welcoming team.

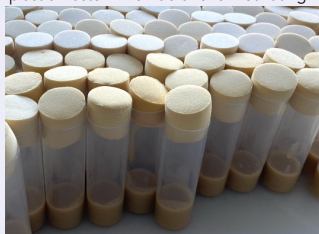
EXCURSIONS AND OTHER NEWS

Reducing Plastic Waste in the Lab

Helen Rothfuß, Nele Kheim

Plastic waste is an ongoing issue everywhere – including scientific research. To ensure sterile working conditions, many lab utensils are made of plastic and intended for single use only. Professor Stefanie Schirmeier has brought the practice to TU Dresden to cut back on plastic waste in her lab and is motivating other research groups to do the same.

Prof. Schirmeier and her team use the fruit fly *Drosophila melanogaster* for their research. Unlike the irritating fruit flies at home, flies in the laboratory don't live on a pile of fruit on the kitchen counter. Rather, they are kept in 10 cm tall tubes with a special food mixture at the bottom. These are made of glass or plastic and are sealed with a foam plug. For the



Plastic tubes used as fly cages for *Drosophila*.

most part, labs use plastic tubes and discard them after the experiment. This can lead to a huge amount of waste. "We have three research groups working with flies at the Faculty of Biology. These three groups alone use up to 10,000 fly tubes every month," explains Prof. Schirmeier. She has been head of the chair of Zoology and Animal Physiology at TU Dresden since 2021. As part of her new position, she is determined to do something about plastic waste. The concept for the reuse of fly tubes is something she has been familiar with since her time in Prof. Klämbt's group in Münster. Now, she is establishing the concept in Dresden.

"Actually, it's quite simple," comments Prof. Schirmeier. "The biggest hurdle is buying a commercial dishwasher. It is so expensive, that it would not have paid off for my group alone. That's why I motivated Prof. Reinhardt and Prof. Dahmann to join me in setting up the reusing infrastructure."

To begin with, used fly tubes are collected and frozen for 48h. Any larvae still living in the food die because of the cold. This is important, to make sure that no genetically modified organisms escape from the lab into the environment. After 48h, the tubes are left to thaw, and the bulk of the remaining food is washed out manually. This is where the expensive dishwasher comes into play. Within a 5-minute cycle, the tubes are freed of any remaining dirt and are ready for the next use. "This way we can use each tube at

least 10 times and produce 90% less waste." The foam plugs are washed in a separate washing machine, meaning they can also be used about 20 times. The cleaning tasks are done by student assistants, whose positions are funded by the Environment Commission of TU Dresden. The goal is to attract more research groups to use this now existing reusable infrastructure and motivate them to also produce less plastic waste.



Commercial dishwasher to reduce plastic waste.

ANIMALS AND MONEY

This part of BioSReports unravels interesting relations between animals and the economy.

US Pigeons in World War I

Layanne Abu-Bader

The human cost of war is the largest and most devastating price a nation must pay during war. Efficient communication is integral to protect soldiers. During conflict in the US, this was managed by the Signal Corps of the United States Army¹. When the US entered World War I in 1917, communication methods included telegraphs, telephones and radio, while continuing older practices of simply using soldiers to run messages across the battlefield². However, all these means of communication had their flaws that proved to be detrimental on the battlefield. Wires were often damaged by artillery, radio signals could only travel short ranges, wires and radio signals could be sabotaged and having a soldier run across a battlefield is just no bulletproof solution either^{2, 3}. When the United States entered the war, however, they noticed that the British and French military were making use of yet another method of communication: the homing pigeon.

Homing pigeons are the domesticated relative of the wild Mediterranean rock dove, *Columba livia*. They have been bred to be able to fly back to their home, known as a loft, from distant and unfamiliar release points⁴. They will locate their loft from distances as far as 1,800km and they can fly up to 15h per day at speeds from 50km/h to 145 km/h, covering roughly 1,100 km^{4, 5}. US military pigeons were trained to recognize mobile lofts as their homing position, instead of an exact geographical location². It is not clear how the birds are able to locate their loft from such distant and unfamiliar release points. Studies suggest homing pigeons use the position of the sun, along with their internal sense of time, to navigate⁶. However, the true method of these birds' special ability remains a mystery⁷.

After observing the success of the British and French pigeon services, the US Signal Corps quickly established their own pigeon service in August 1917². The new pigeon service acquired a total of 2,350 pigeons. Those birds were either donated or bought for 2 \$, which sums up to less than 4,700 \$². Mobile lofts were designed and built, and the pigeons were trained in 110 Army posts in the United States². By October, 6 men, 800 pigeons, 12 mobile lofts, and a large supply of feed were already on a ship headed for France². At the end of the war, the pigeon service consisted of 9 officers and 324 enlisted men, making it the smallest and cheapest service in the Signal Corps in terms of personnel and supply^{6, 2, 10}. Despite the small size and cost of the US Pigeon Service, these birds provided a priceless service to the war effort. Pigeons were often used to deliver S.O.S. messages from stranded troops, resulting in hundreds of lives being saved⁶. During the Meuse-Argonne Offensive of 1918, 550 American soldiers were pushed behind German lines, putting them right in the middle of heavy artillery fire from their own countrymen². They were cut off completely from American troops. Their only hope was a carrier pigeon, named Cher Ami, who was released with an urgent note tied to his leg. During his 40 km flight Cher Ami was shot in the chest and his leg was torn in half, yet he still delivered the message to his loft in under 25 minutes². The artillery fire stopped immediately, allowing the 194 surviving soldiers to make their way back to safety². There are many similar stories of hero pigeons, like Cher Ami, delivering lifesaving messages during war. Over 500 important messages were successfully delivered by pigeons at the battle front, and not one message had gone undelivered according to the US Chief Signal officer².

The value of pigeons in the US Army goes far beyond the money saved by the Signal Corps. Hundreds of lives were saved directly by the delivered pigeon messages, and countless more were saved indirectly by providing a means of efficient communication between the troops on the battlefield. These pigeons made up for the many shortcomings of available systems of communications, especially on the chaotic front lines, where one message could alter the course of a battle. It is estimated that 300,000 pigeons were used by the Allied forces during the course of World War I, many of which have been decorated for their irreplaceable service¹¹.

*Source nr. 6: Osman, A. H. Pigeons in the Great War: A Complete History of the Carrier-Pigeon Service during the Great War, 1914 to 1918. "The Racing Pigeon" Publishing Co., Ltd., 1929 Online version not available