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# Statement on furnishings and enrichment for laboratory animals

Environmental enrichment is often mentioned in discussions about the welfare of laboratory animals. In Sweden there are two concepts used to describe modifications to the housing environment – furnishings and enrichment. The two concepts are frequently used interchangeably. The Swedish National Committee for the Protection of Animals Used for Scientific Purposes wants to clarify the differences we believe exist between furnishings and enrichment.

The National Committee considers that:

- **Furnishings** refers to resources in the enclosure that meet the animals' basic needs.
- **Enrichment** refers to resources provided to the animals to offer stimulation beyond their basic needs.

# Introduction

Each animal species has certain basic needs that must be met to prevent the animals from experiencing negative health and welfare. Such basic needs include food, water, and resting places, but they can also include other elements in the animals' environment such as hiding places and raised areas. If the basic needs are not met, animals may try to fulfil the unmet needs by exhibiting behaviours that are perceived as abnormal [1]. For example, domestic hens perform dust-bathing behaviours even if they do not have access to a suitable place to dust-bathe [2]. The National Committee considers resources that meet basic needs, such as a dust bath for domestic hens, as furnishings. Enrichment, on the other hand, refers to resources that go beyond what is needed to satisfy the animal's life-sustaining and basic behavioural needs and provide them with extra stimulation [3].

What constitutes furnishings or enrichment varies depending on the species in question. For resources to be considered as furnishings or enrichment, the animals must have an interest in them and the opportunity to perform behaviours that the resources enables, since resources that an animal species do not use can neither be considered furnishings nor enrichment.

When choosing furnishings and enrichment, it is important to consider how the resources could affect the animals that are included in the experiment. For example, it may be less appropriate to use tangled material in an experiment where the animals have difficulty walking or have implanted sensors that protrude, or to

give animals treats to dig for in a metabolism study. There should be an enrichment plan to follow at the start of the experiment, and the researcher needs to know what furnishings and enrichment have been used when writing their report on the experimental results.

# Examples of furnishings and enrichment

When we look at different resources that laboratory animals can be provided with, it becomes clear that furnishings for one animal can be another animal's enrichment and vice versa. Below, we use examples to show that this can differ even between species that may be perceived to have similar needs.

#### Nesting material

In a section on furnishings and enrichment in Swedish legislation for laboratory animals (Statens jordbruksverks föreskrifter och allmänna råd (2019:9) om försöksdjur, saknr. L150), it is stated that mice, rats, gerbils, hamsters, and guinea pigs should have access to nesting material.<sup>1</sup> According to the National Committee's definition of the concepts, whether nesting material can be considered furnishings or enrichment depends on the species. Almost all mice build nests regardless of strain, life stage, and sex [4,5]. The same applies to hamsters [6] and gerbils [7]. Rats do not build nests as consistently as mice. In general, they only build nests during reproduction or if it is cold in the room [8,9]. Guinea pigs do not build nests at all, but usually use natural formations or burrows constructed by other animals [10]. Therefore, according to the National Committee's definition nesting material is furnishings for mice, gerbils and hamsters, while it can constitute enrichment for rats and guinea pigs, with the exception of pregnant rats that need nesting material. Note that we distinguish between nesting material and bedding material, where rats and guinea pigs need bedding material for a comfortable resting place [11,12].

### Raised area

The rabbit is a species that frequently watches over its surroundings by lifting the head or the entire front part of the body [13]. In a section on furnishings in the chapter on rabbits in Swedish legislation for laboratory animals, it is stated that rabbits over 10 weeks of age should have access to a raised area.<sup>2</sup> Just as the legislation states, this is important for rabbits because it helps them to keep watch and it can counteract stress [14]. Therefore, a raised area is furnishings for rabbits according to the National Committee's definition. For other species, such as mice and rats, a raised area can instead be seen as enrichment because it is not a direct need, but they are skilled climbers [15,16] and can therefore appreciate a three-dimensional environment. In contrast, a raised area can hardly be considered an

<sup>&</sup>lt;sup>1</sup> 17 ch. 4 § SJVFS 2019:9.

<sup>&</sup>lt;sup>2</sup> 18 ch. 2 § SJVFS 2019:9.

enrichment for guinea pigs, who rarely jump and instead prefer to hide in tunnels and vegetation [11].

# Opportunity to dig

Digging is a natural behaviour for many animal species e.g. a mole digging a tunnel, a fox burying its prey or a frog digging a hole to hibernate in. Among animals commonly used in research, digging is a natural behaviour for almost all types of rodents such as mice, rats, hamsters, and gerbils [17]. Digging is also a well-known behaviour for rabbits. The opportunity to dig is therefore considered as furnishings for these species. A guidance material previously developed by the Swedish 3Rs Center, shows that there are several species of fish used in research that dig regularly. This includes the European eel, hagfish, and plaice, which spend large parts of their lives buried in the substrate, but also various types of gobies and cichlids that dig pits before spawning (reproduction). For these species, the opportunity to dig is considered furnishings in most cases. For species that only dig during reproduction, it is not furnishings outside the reproductive period. The substrate can then instead be seen as enrichment of the aquarium because it can still provide stimulation, but only if the fish interact with it. Digging opportunities can also be seen as enrichment for dogs, since dogs are well known to enjoy digging. There are also common laboratory animals that do not need digging opportunities, such as guinea pigs and clawed frogs. For such species, digging opportunities are neither furnishings nor enrichment.

### Perch

For most birds, it is important to be able to rest on a perch, this also applies to domestic hens [19]. In Swedish legislation, it is required that pigeons and domestic hens kept as laboratory animals should have access to perch.<sup>3</sup> According to the National Committee's definition, the perch is furnishings for these birds. Animals that climb, such as mice, rats, and non-human primates, do not have a direct need for a perch, but can appreciate the variation a perch provides in the climbing. For these animals, the perch can thus constitute enrichment. For most other animals, such as clawed frogs, guinea pigs, rabbits, and pigs, the perch has no impact on everyday life and therefore constitutes neither furnishings nor enrichment.

# Examples of enrichment that are relevant for most species

• Foraging for food – providing animals with food, covers their basic nutritional needs. Animals, living in the wild, spend a large part of their day searching or hunting for food [20]. Therefore, it can be enriching to scatter food in bedding material, freeze it in large ice cubes, place it in activation toys, or similarly extending the eating process also for animals held in captivity. Allowing

<sup>&</sup>lt;sup>3</sup> 24 ch. 3 § SJVFS 2019:9.

animals to try different types of food where possible can also constitute an enrichment [20,21].

- **Destroying materials** it is commonly known that rodents and rabbits appreciate chewing on materials. For these species, it is also important for dental health to be able to gnaw [22,23]. Other animals such as pigs and dogs also enjoy destroying materials. Depending on the species, it can involve different types of materials. A cardboard box, possibly filled with some type of straw material, works as enrichment for many common species of laboratory animals.
- Social contact (direct or indirect) in nature, all species have social contact with conspecifics and other species in one way or another [24]. For social species, this often involves living in groups, while for solitary animals, it can entail investigating scent marks from other individuals. Social species should be kept in pairs or groups<sup>4</sup>, but where this is not possible and for naturally solitary animals, it can be enriching to temporarily stay in areas where conspecifics have previously been. Aquatic animals can also get a sense of living in a larger group by having a view into another aquarium or a reflective area, which is relevant for some species.
- **Dynamic environments** an environment with many different structures gives the animals opportunities to make choices [3]. It also creates opportunities for the animal to express several different types of behaviours. Creating a dynamic environment can involve building vertical structures for climbing or keeping watch, creating a large open space for running or swimming, providing animals with various types of hiding places, or building partitions that give animals the opportunity to create their own territory and keep the cage, enclosure, or aquarium clean.
- **Cognitive stimulation** [3] providing the animals with different types of cognitive stimulation can be perceived as enriching. This can include training [25] and various types of problem-solving [26]. As enrichment, it can therefore, in addition to the legally required training<sup>5</sup>, be relevant to train or similarly activate the animals. This can involve training tricks, figuring out how treats come out of a toy, or providing the animals with materials that they need to manipulate to access a reward.

Some furnishings and enrichment can be very attractive to the animals, leading to guarding of the resource and fights occurring. Therefore, it is important to ensure that the resource is available in sufficient quantity so that each individual can get access to it. At least one item of the same resource per animal is a good guideline.

<sup>&</sup>lt;sup>4</sup> 16 ch. 15 § SJVFS 2019:9.

<sup>&</sup>lt;sup>5</sup> 16 ch. 7 § SJVFS 2019:9.

Spreading the resource in the enclosure so that one individual cannot guard everything at once, can also prevent fights.

When trying different types of furnishings and enrichment, you also need to evaluate their effect on the animals' welfare. The British 3Rs Centre, NC3Rs, has developed a guide which you can use as support.

#### Approaches to evaluating enrichment (nc3rs.org.uk)

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