
Environmental Enrichment for Guinea Pigs: A Discussion by the Laboratory Animal Refinement & Enrichment Forum

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The question was raised how the environment of guinea pigs can be best enriched in the research laboratory setting.

"Guinea pigs have a strong need to hide. Their feeling of security depends on access to a covered refuge. Guinea pig-sized PVC tubing provides great shelters. Group- and single-housed animals hide in those tubes, run through or jump over them. The tubes are a constant focal point of attraction for them" (Banjanin). "Like all rodents guinea pigs shun open areas and tend to stay at the periphery close to the walls of an otherwise empty enclosure. If positioned in the central area of the cage, a shelter not only will be a place of refuge for guinea pigs but it will also increase the usable floor space for them" (Reinhardt).

"We routinely use PVC pipe sections which the animals use as shelter. They might prefer cardboard boxes, which they could gnaw and manipulate, but many of our researchers are concerned that the guinea pigs might ingest some of this easy-to-gnaw material, which then could exert an effect in nutritionally sensitive protocols. We have found no evidence that the animals gnaw the PVC pipes" (Johnston).

"We've used everything from PVC tubes to paperboard oat containers to offer our guinea pigs secluded places. It's been my experience that individuals are just as easily viewed with these objects as without. If an animal is staying inside the tube non-stop then there's a problem and it's time to do a more thorough examination than just look through the cage" (Bell). "Guinea pigs are startled easily, so if an animal doesn't emerge from the PVC tube when you approach the cage, chances are that there is something wrong, or you've spoiled your guinea pig rotten" (Banjanin).

"Hay is the perfect environmental enrichment for guinea pigs who not only can hide and nest in it, but also nibble and eat it. I have used autoclaved hay successfully for a decade" (Cunneen). "We autoclave the hay at 121°C [250°F] for 20 minutes as we often find dirt and the remains of small rodents in it. If the animals are on a protein restriction regimen we replace

the hay with autoclaved wheat straw which provides the bulk required but minimal nutrition. Autoclaving doesn't seem to affect palatability. We provide enough hay or straw for our guinea pigs to hide under it, so we only use uncut hay or straw straight from the bale. The animals get fresh hay or straw every day. We have encountered only one rather specific problem. Long blades would occasionally wrap around the cannula of tethered animals thereby jeopardizing the proper and stable position of the cannula. Rather than depriving these animals of their enrichment we now routinely chop the material for all cannulated animals into about 6 inch long particles and haven't seen the problem since" (Barley).

"Our individually caged guinea pigs tend to eat as much hay as we would give them while disregarding most of their regular diet. To assure that they eat enough of the standard food, we have decreased the amount of hay and the number of times they receive it" (Quintero).

"For additional environmental enrichment we use old polypropylene mouse cages cut in half or small cardboard boxes. We had offered the animals drainage pipes cut into approx 18 inch lengths but found that they prefer rectangular shelters. These need to be strong enough to support the weight of several guinea pigs, as ours spend as much time on top of the shelter as in it - so much for being burrowing animals!

The floors in our large group-cages are gridded but we now furnish each cage with a 'tray' (old rabbit cage litter trays) filled with sawdust. The tray covers more than half of floor area thus giving the guinea pigs the opportunity to get off the grid if they want. Pregnant females are always housed in solid-floor cages" (Barley).

"We recycle old rabbit-cages each furnished with a Macrolon IV rodent cage for our guinea pig groups. In the Macrolon cage the animals have access to a 2-cm layer of sawdust topped with approximately 8 cm of hay (Figure 1). Food and water is placed outside the Macrolon cage to keep the sawdust and hay relatively dry and clean. Generally the animals defecate and urinate on the grid of the rabbit cage, but they spend most of the time in the Macrolon cage digging their way through the hay, nibbling and eating hay, sleeping in the hay and hiding in quasi-dens made of hay.



Figure 1. Old rabbit-cage furnished with a Macrolon IV rodent cage for group-housed guinea pigs. Note the sawdust topped with hay in the Macrolon cage. Photo by Richard Weilemann.

Our large breeding groups live in floor pens. For enrichment, hay is placed in plastic barrels that have holes in the bottom. Since guinea pigs love to go under anything that covers them, we mount the barrels on approximately 20 cm high iron legs allowing the animals to run under the barrel. This arrangement also provides foraging enrichment, and the animals skillfully pull strands of fresh hay through the holes in the bottom of the barrel. During the cleaning procedure the barrel is moved out of the pen" (Weilenmann).

Guinea pigs do not manipulate their food but pick it up directly from the ground with their teeth.¹ "This suggests that any toy-like enrichment gadgets that may be useful for rats, mice, hamsters or rabbits serve little or no purpose for guinea pigs, especially those who are kept in single-cages. Guinea pigs show little interest in wooden blocks or any other similar toy-like enrichment gadgets" (Banjanin) but they do chew softwood sticks.²

"Although guinea pigs do not manipulate their food, I have often observed that they use their hands to hold pieces of hay down on the floor while nibbling/chewing back and forth the length of a stem without actually consuming the stuff" (Cunneen).

"Our animals have access to wood pieces and Nylabones affixed to the front of their cages. Teeth marks leave no doubt that they do gnaw on these objects" (Quintero).

"Guinea pigs have a strong need for social contact with other guinea pigs. Social isolation is a serious disturbance for them. In our institution it is a rule to group-house the animals, unless an experiment specifically requires single-caging, for example when the subject has to be tethered. We keep single guinea pigs in transparent cages placed in such a way that

they can maintain visual, olfactory and auditory contact with other guinea pigs" (Banjanin). This is an effective way of buffering the stress resulting from social isolation.³

"Our previous Home Office inspector expected that all our social animals, including the guinea pigs, be housed in a social setting whenever possible. Social housing has therefore become the standard. If investigators really want to isolate animals, then a case has to be made for it. I don't remember any researcher who had a problem with this.

It is now written into all the project licences that where single-housing of a social animal is justified on scientific grounds the subjects must be able to communicate with other animals of the same species. This also applies for hospitalized animals, although a few of our post-operative animals may be singly housed for a short while, usually until they are mobile again. Rarely do we encounter problems with sutures being taken out by cage companions. Protocols requiring single-housing may be licenced when the subjects are tethered and have external cannulae or when food intake is being recorded" (Barley).

"We have radios on softly in the background in all our rooms as it seems to stop the animals from being startled when people enter the room. That's only a subjective observation and I have no hard data to back it up. However, music is a bonus that benefits the animals at least indirectly by keeping the crew who cares for them in a happy mood" (Barley).

"In summary, social-housing is the most species-appropriate living environment for guinea pigs. If a research protocol requires single-caging, guinea pigs should always be able to maintain visual, auditory and olfactory contact with other guinea pigs to buffer the stress of social deprivation. The provision of PVC tubing or, preferably rectangular boxes, addresses the animals' strong need for a covered shelter. Autoclaved hay or straw offers optimal environmental enrichment. This material can readily be presented in such a way that the animals have to work for its retrieval, i. e., engage in foraging activities" (Reinhardt).

REFERENCES

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