

The Environmental Enrichment Committee (EEC)

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The Environmental Enrichment Committee

Set up to look into EE used at IC with aim to standardise & improve welfare

- Composed of technicians from all sites
- Managers
- Plans to include early career academic

Environmental Enrichment

Purpose

- Mimic natural environment
- Prevent boredom/stereotypic behaviours
- Allow species specific behaviour
- Improve welfare in line with 3Rs
- Provide physiologically normal, standardised animals for research, reducing confounding factors

Environmental Enrichment

Effects of enrichment

Some studies have suggested the following:

- Access to EE can reduce fear responses in laying hens
Access to litter during rearing and environmental enrichment during production reduce fearfulness in adult laying hens, Brantsæter, Margrethe et al. Applied Animal Behaviour Science , 2017
- Wheels can increase aggression in group housed CD1 male mice
Effects of a running wheel-igloo enrichment on aggression, hierarchy linearity, and stereotypy in group-housed male CD-1 (ICR) mice, Howerton, Christopher L. et al. Applied Animal Behaviour Science , 15 December 2008, Volume 115 , Issue 1 , 90 - 103
- EE can reverse stress response in weaned rats caused by periods of pre-weaning maternal separation
Environmental Enrichment Reverses the Effects of Maternal Separation on Stress Reactivity, Darlene D. Francis, Josie Diorio, Paul M. Plotsky, Michael J. Meaney, Journal of Neuroscience 15 September 2002, 22 (18) 7840-7843

Environmental Enrichment

Examples of enrichment

- Nesting material
- Tunnels & shelters
- Company – social species
- Toys
- Food/treats/foraging opportunities
- Water baths



Environmental Enrichment

Examples of enrichment used at Imperial College



EEC Members

- Bruna Delfini – Technician South Kensington
- Rob Floyd – AAALAC Programme Manager
- Ruth Horler – Technician Hammersmith 2
- Hannah Jones – Technician Hammersmith 1
- Sarah Lane – 3Rs Programme Manager
- Emma Rowley – Chair & Technician Hammersmith 1
- Kasia Smigielska – Technician St. Mary's
- Gareth Wild – Technician South Kensington
- Georgie Wilkinson – NVS and previous Chair

The aims of the EEC

Mission Statement

- Ensure good practice maintained at all IC sites regarding use of EE
- Improve welfare of animals under our care
- Enhance environment & encourage exhibition of natural behaviours
- Help reduce abnormal behaviours occurring
- Ensure open, on-going process of re-evaluation, research & education regarding EE used at IC
- Ensure 3Rs are always considered when making decisions regarding EE

Goals attained

- All enrichment devices & procedures & frequency of use currently in use at each site for each species listed
- A list of vendors created & current prices reviewed
- Approval given for effectiveness, suitability & cost/benefit for continued use of all devices
- Device use & procedures standardised across IC sites (approved by CBS Director/NVS)
- EE posters produced detailing EE to be used for each species

Ongoing & in process






- Set up regular meetings to ensure regular review of current devices & processes
- Ensure market research consistently performed
- Ensure forum available for all sources to present new ideas to
- Disseminate all progress for animal welfare and 3Rs achievements
- Posters, contributions to meetings, seminars, conferences & CBS led initiatives

Enrichment Poster

- Displayed in all animal holding rooms as minimum required EE for all species
- Standardised across all sites

Mammals - Enrichment Schedule

Examples of approved enrichment products. If you are unable to use these due to scientific reasons please discuss with the CBS Site Manager

MOUSE		Small tunnels Tongue depressor or small chew block Face tissues or Sizzlepet Mouse houses (breeders)
RAT		Medium fun tunnel Tongue depressor or medium chew block Sizzlepet
RABBIT		Shelter (Cardboard boxes houses/ Shelf) Fun Tunnel Hay - 2 handfuls /rabbit/day Large chew block Natural rubber ball or other toy Bunny fruit Block (once weekly)
GUINEA PIG		Medium fun tunnel or Guinea pig hut Hay 1-2 handfuls/GP/day
FERRET		Medium fun tunnels Sizzlepet Toys

Version 1 Effective Date: 06/06/16
Review Date: 06/16
CBS 7.001

Aquatics/Amphibian-Enrichment Schedule

Examples of approved enrichment products. If you are unable to use these due to scientific reasons please discuss with the CBS Site Manager

ZEBRAFISH		Brine Shrimps every 1-2 days
XENOPUS		Plastic tubes Plastic shelter
AMPHIBIAN		Plastic shelter (frogs and newts) Live feed (frogs and newts) Water bowl (frogs) Soil (frogs) Brick (tadpoles) Lettuce (tadpoles)

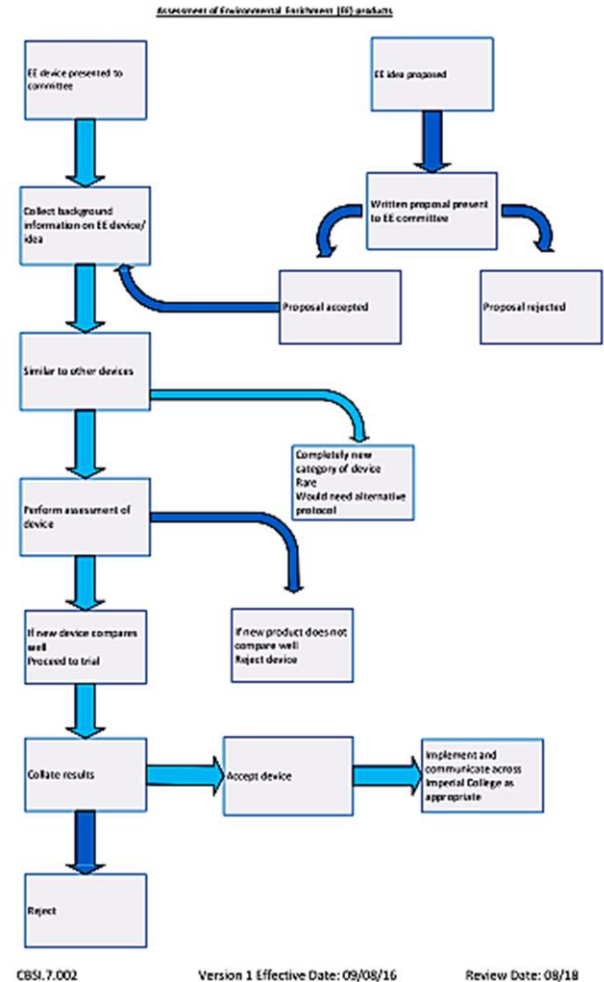
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Work so far

- Extra EE devices for guinea pigs & ferrets
- EEC noticeboards displayed at all sites
- Approved product list created
- EE for avian species investigated & implemented
- EE SOP updated
- Piece written for CBS newsletter
- Documents produced in order to conduct EE device trials
- 1 trial completed, 1 in progress

Assessment of proposed devices

- Short & long form flow chart for assessment of EE products for trial
- Displayed on noticeboards & available on shared Z drive
- EE device trial information document for products approved for trial



Enrichment device trials

- Comparison of gnawing devices within a mouse facility
 - Completed
- Tecniplast 1.7L sloped breeding tank for zebra fish trial
 - In Progress

Comparison of gnawing devices trial

Chew blocks vs chew sticks



- Blocks
- Soft aspen wood
- 5x1x1cm



- Sticks/tongue depressors
- High tensile birch
- 15x1.5cm

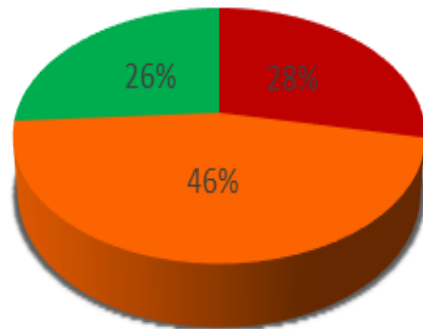
Comparison of gnawing devices trial

Chew blocks vs chew sticks

- Both devices used across different IC sites
- Measure parameters potentially indicating mouse preference
- Provide recommendations for similar trials
 - 74 cages randomly assigned either block or stick
 - Score sheets used to score amount device chewed
 - Other data collected
 - Data collected by technicians during cage change
 - Each cage followed for up to 8 weeks

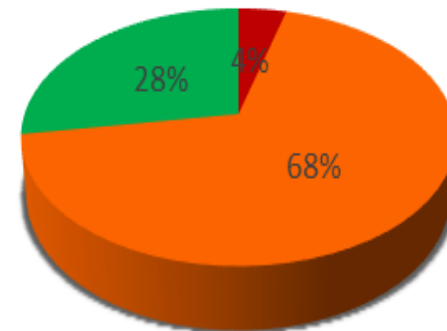
Amount device chewed

Amount STICK chewed over 8 weeks
n=192



■ Not chewed at all ■ Chewed somewhat ■ Chewed very much

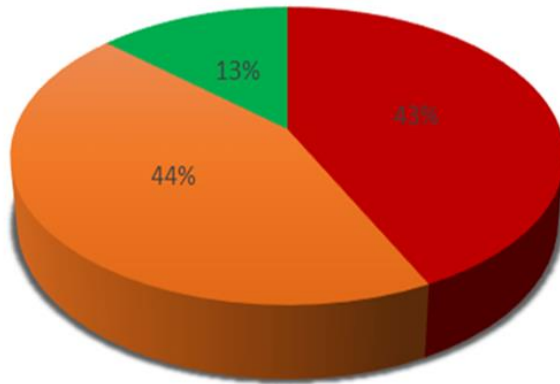
Amount BLOCK chewed over 8 weeks
n=189



■ Not chewed at all ■ Chewed somewhat ■ Chewed very much

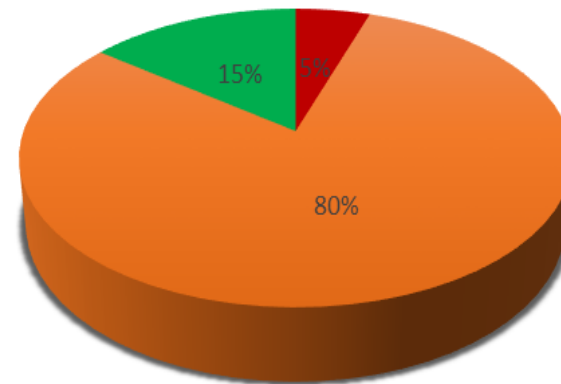
Amount device chewed by C57BL/6

Amount STICK chewed by C57BL/6
n=105



■ STICK Not chewed at all ■ STICK Chewed somewhat ■ STICK Chewed very much

Amount BLOCK chewed by C57BL/6
n=116



■ BLOCK Not chewed at all ■ BLOCK Chewed somewhat ■ BLOCK Chewed very much

Comparison of gnawing devices trial

Results

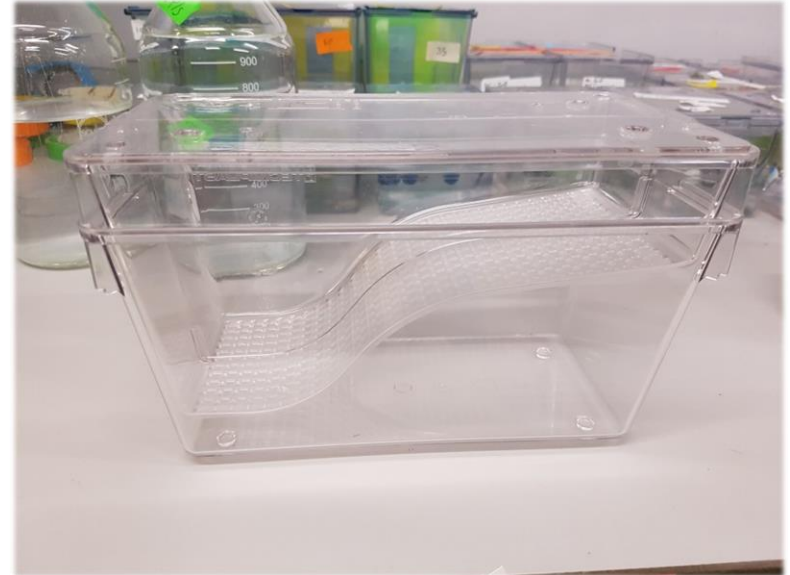
- Block accepted by CBS managers & NVS for use across all IC sites
 - 24% increase in use of blocks over sticks
 - Increased use could indicate preference
 - Increased use could be due to composition of wood or dimensions of devices
 - C57BL/6 strain showed striking increase in use of blocks over sticks
 - 3Rs & welfare implications

Sloped breeding tank for zebra fish trial

In progress



- Static breeding tank currently used
- Flat, perforated base
- Divider



- Tecniplast 1.7L sloped breeding tank
- Sloped, perforated base
- Pebble-like bottom

Sloped zebra fish breeding tank trial

Trial for EEC by Ryan Cini

- Compare egg production & quality between tanks
 - Both tanks similar design/dimensions
 - Sloped, pebbled base mimics natural environment
 - Positive results in other facilities
 - 3Rs implications
 - Trial designed and being carried out by Ryan Cini

Future work

- Conduct further trials of EE products using documents created
- Involve technicians in EE & encourage them to submit ideas
- Encourage techs and PiLs to evaluate EE protocols currently in place if deviate from the standard EE protocol
- Provide scientific justification for deviation
- Look into alternatives if possible, where standard EE may interfere with scientific results
- Hold staff seminars to provide information and feedback
- Add EEC resources & information to CBS website

Thank you!

- None of this work would have been possible without the help, support & encouragement of Imperial College, CBS managers, technicians, vets, support staff & researchers
- We can all work together to ensure the highest standards of enrichment & therefore increased welfare for the animals under our care

