HOW TO ASSESS WELFARE IN GENETICALLY ALTERED ANIMALS?

Anne Zintzsch
Animal Welfare Officer
... IN ANIMAL WELFARE LEGISLATION
USE OF GENETICALLY ALTERED LAB ANIMALS IN GERMANY

40% of mice used in animal experiments were transgenic (2013)
STATUS QUO AT THE MDC

Mouse strains
- 77% non-harmful phenotype
- 23% with a potential harmful phenotype

Animal reporting
- 58% not genetically altered
- 31% genetically altered non-harmful phenotype
- 11% genetically altered with harmful phenotype
**LEGAL REQUIREMENTS FOR SEVERITY ASSESSMENT**

RECOMMENDATIONS FOR A BASIC WELFARE ASSESSMENT

- 7 m, 7f
- Neonates, at weaning, adult every two months → line-specific

Form
Version 2 of 21 July 2015

„Assessment of newborn litter“*
*at the latest during the first cage change

Location (Institute and room): __________________________ Husbandry system (e.g. IVC, conventional cage, filter top, isolator etc.; hygiene status where applicable):

BASIC WELFARE ASSESSMENT - OBJECTIVES

- Refinement
  - prospective
  - actual
  - none
  - mild
  - moderate
  - severe

Share & Archive

The ARRIVE guidelines
Animal Research Reporting & Use-For
EXAMPLES ON SEVERITY ASSESSMENT AND CLASSIFICATION
EXAMPLE I: SUDDEN CARDIAC DEATH
Sudden cardiac death – Which severity degree would you assign?

- None: 0
- Mild: 4
- Moderate: 6
- Severe: 4
<table>
<thead>
<tr>
<th>No.</th>
<th>Symptom/disease</th>
<th>Non-harmful phenotype</th>
<th>Mild severity</th>
<th>Moderate severity</th>
<th>Severe severity</th>
<th>Monitoring, Refinement, special housing requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>Cardiac arrhythmia, e.g. asymptomatic cardiac channelopathies with structurally normal heart&lt;sup&gt;52&lt;/sup&gt;</td>
<td></td>
<td>Short-term arrhythmia with sudden cardiac death</td>
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</tbody>
</table>

7 Cardiovascular and haematological diseases

DECOMPENSATED HEART INSUFFICIENCY
Decompensated heart insufficiency – Which severity degree would you assign?
# GUIDELINES ON SEVERITY ASSESSMENT AND CLASSIFICATION

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<td>7</td>
<td>Cardiovascular and haematological diseases</td>
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<tr>
<td>7.4</td>
<td>Dilated or hypertrophic cardiomyopathy</td>
<td></td>
<td>Transient and short-term intensified breathing after normal activity in the home cage; no permanent impairment of general condition</td>
<td>Global heart failure with permanent respiratory distress and impairment of the general condition, classification depends on expression of symptoms</td>
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</table>
EXAMPLE III: MICROPHTHALMIA, ANOPHTHALMIA
Blindness – Which severity degree would you assign?
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<tbody>
<tr>
<td>4.1</td>
<td>Eyes</td>
<td></td>
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</table>

4.1.3 Microphthalmia, anophthalmia

|                  | Blindness$^V$ (e.g., small or no eyes) without impairment of normal behaviour |     |                  |                | House animals in constant environment             |

$^IV$ The lack of more than one sense is considered to cause an impairment that should be classified as harmful phenotype

$^V$ If the animals are kept in a constant environment.

EXAMPLE IV: DYSTROPHIC EPIDERMOLYSIS BULLOsa

Dystrophic epidermolysis bullosa – Which severity degree would you assign?
### 3 Alterations of the skin and the coat

#### 3.3 Inflammatory skin diseases

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<tr>
<td>3.4</td>
<td>Dystrophic epidermolysis bullosa</td>
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Severe, extensive alterations of the skin (blisters), even limbs may be lost, changes of mucous membranes with compromised food uptake, hyperalgesia\(^{33}\)
EXAMPLE V:
OBESITY
Obesity – Which severity degree would you assign?

- None: 1
- Mild: 11
- Moderate: 4
- Severe: 0
## GUIDELINES ON SEVERITY ASSESSMENT AND CLASSIFICATION

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### 10 Metabolic diseases

10.3 Obesity<sup>57</sup>

| | | Bred for obesity without impairment of normal behaviour or general condition | Evidence of components of the metabolic syndrome (obesity, lipid metabolism disorder, elevated levels of blood glucose, hypertension). Classification depends on the level of impairment of the general condition | | Dietetic food on cage floor, soft bedding when movement is impaired, monitoring the genital health, rat: normal-weight “grooming mate”, more frequent change of cages |

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TAKE HOME MESSAGE

- Welfare assessment is **line-specific** according to prospective severity assessment and should be adapted to observations.

- **Team approach** – scientist, animal caretaker, AWO/AWB

- **Guidelines** on severity assessment and classification as starting point and will be reviewed regularly according to **your feedback**

- **Transfer and archive severity assessments** to support animal welfare and science!
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(now MDC)

HU
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Charité
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ANY QUESTIONS?

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