Uh-Oh .... This animal doesn't look well ......

Ron E. Banks, DVM, Dipl. ACVPM, Dipl. ACLAM, CPIA
Director, Office of Animal Welfare Assurance
Duke University & Duke University Medical Center

THE ABC'S OF DAILY OBSERVATIONS
Today’s Objectives

- Review assessment tools which may be used for doing daily health checks
- Discuss clinical signs observed during daily health checks
- Consider implications of the observed clinical signs

What We Won’t Talk About

- MHV (Mouse Hepatitis Virus)
- MPV (Mouse Parvovirus)
- Pinworms
- Other specific diseases …

(We covered these a few months ago)
Why Will We Not Talk About Them Today?

Mouse with MHV, MPV, and pinworms

Mouse without MHV, MPV, and pinworms

ASSESSMENT TOOLS
Very important to notice, but they give little or no direction as to what is really wrong

A rodent’s body condition can be evaluated by using a standardized scoring system from 1 (emaciated) to 5 (obese).

Set clear performance parameters (include in protocol?): Examples …

- BC1 = Requires immediate euthanasia
- BC 2 = Requires veterinary consultation
- BC 3 = Perfect!
- BC 4 = Hmmm …. Disease? Over feeding? Wrong feed?
- BC 5 = Potentially serious weight gain.
BODY POSITION

- A rodent will have a hunched posture (head down, feet close together) when in pain or feeling ill.
- It usually will not move willingly.
- It is a general sign of being sick and/or depressed, or just ADW (or ADR).

Not a happy camper! But ill?

Normal posture  Hunched posture

WEIGHT LOSS

- Acute weight loss:
  - Indication of disease
  - Digestion
  - Intake of food OR water

- Chronic weight loss:
  - More important in rats <?
  - Indication of disease or distress
  - Many non-disease causes
    - Teeth
    - Feed / Water
    - Study causes
    - Age

Notes:
- Rats gain weight throughout life; mice should be stable
- GPs and rabbits have large cecae
- Hamsters horde feed
POOR APPETITE

- Not necessarily anorexia
- P.A. commonly seen in rabbits
- P.A. rarely seen in rodents … unless
  - Feed changes
  - Water issues (taste / access)
  - Neophobia (new ‘things’)
  - Teeth
  - Gut dysbiosis
  - Stress
- Difficult to assess in group housed animals!!!!

POTENTIAL OBSERVATIONS
Abscesses are seen as very fast growing bumps on any part of the body. If left long enough they may rupture and contaminate the environment. Immunocompromised animals often get abscesses. Normal mice that are stressed or have wounds.

- Barrier mice with Staphylococcal abscesses.
- Staphylococcus spreads easily
- Staff must follow strict husbandry procedures.
- Abscesses also commonly infect the hair follicles of the muzzle
- Mice (especially male) often have abscesses of the perineal glands or perineal area (trauma).
- This abscess has opened and is releasing the pus.

ANEMIA

- ANEMIA is a reduction in the number of red blood cells.
- May be a symptom of many conditions:
  - Poor diet, cancer, illness, blood loss, etc.
- Places to inspect:
  - The red eyes of albino mice look pink (pale) and the ears also appear pale.
  - The foot pad is another area to look for paleness assoc. with anemia.

Normal

- Note pale body

Anemic mouse Normal red eyes
**BACK PROBLEMS**

- **BROKEN BACK** is a common outcome of poor handling!!!
  - Prevent by supporting the hind quarters
- **SPLAY LEG** is generally a genetic outcome, but can be caused by rough handling too.

**BEHAVIOR PROBLEMS**

- **INACTIVITY** in rodents easy to miss!!
- Rodents are nocturnal and avoid appearing sick.
- Inactivity is normal in cats…
BITE WOUNDS

- Bite wounds usually are the result of fighting between male mice post-weaning.
- Some strains are much more aggressive than others, with female aggression and male-female aggression.
- Overcrowding, environmental stresses, mixing new groups of mice together, and exposure to the odor of females all increase fighting.
- Wounds are primarily on the tail and back.

Female bitten on back of neck by male. Notice tail of a pup is also bitten.
Males will bite each other around the genitals.
Typical tail bite wounds. Bites on the tail tip result in a blackened tip that then falls off.

BIRTH DEFECTS

- Some birth defects are fatal and the pups are reabsorbed by the mother, but others involve “non-vital” parts and the mice survive very well.
- The same mouse pair can go on to have future normal litters.

Missing lower hind leg
Hind leg is broad, flat, and partially webbed
Soft tissue growth with hair
Because of their lack of hair and thin skin it is possible to actually see the outline of internal organs in the nude mouse abdomen.

The belly may appear dark (black) if:
- The spleen is swollen (potentially an indication of tumor development),
- There is bleeding in the abdomen, or
- The intestines are swollen and pushing against the skin.
CAGE INJURIES

- Cage injuries can occur when a cage has sharp edges or cracks in the plastic. Sometimes a hair, thread, or string can tangle around a body part.

- Bedding material wrapped around the hind leg and cut off the circulation

- Mouse with injured leg

- This rat got its toes caught in a small crack in the plastic cage

COLOR MUTATIONS

- BELLY SPOT in C57/BL6:
  - A belly spot refers to a spot of color (white) on the belly of a mouse.
  - It is generally due to a color mutation during development of the fetus.

- Belly spot
COLOR MUTATIONS

- Color mutations are possible in any strain of mouse.
- Does not mean the mouse is genetically impure.
- Usually only one pup in the litter is affected and the parents continue to have future normal litters.
- If all pups are affected or it is a hybrid litter with different colored pups genetic contamination should be considered.

With this litter all of the pups had a white belly band, however the strain was still genetically pure.

One pup in the C57BL/6 litter has a color mutation that changed the black to brown.

This was an F1 hybrid litter (B6C3F1). The multicolored pups indicate that genetic contamination has occurred.
Breast tumors in mice appear as moderately growing (not as fast as an abscess) lumps on the belly, shoulder, or flank of female mice. Some strains are much more likely to develop tumors than others.

Breast tissue on mice extends over shoulders and up the flank. This is not true for rats.

Tumor may be frequently observed in certain strains of mice.
- They may appear as lumps under the skin, multiple swollen lymph nodes, or swelling of the belly if the cancer is internal.
- Cancer often can’t be differentiated from an abscess or cyst unless opened, but tumors tend to grow slower.

Lymphoma with swollen lymph nodes visible

Thyroid tumor
**DEHYDRATION**

- Dehydration simply means the animal’s body fluids are low.
- Most frequently due to a problem with the water delivery.
- Can occur with illness or weakness.
- When dehydrated the skin on the back of the neck stays tented up if pulled gently and then released.

**Testing for dehydration**

- Normal hydration
- Dehydration (wrinkled skin)
- Severe dehydration

**DERMATITIS**

- Dermatitis is an inflammation of the skin.
- It may simply appear as a red rash, dry flakey skin or an open raw area (ulcerative dermatitis), maybe with a discharge.
- The initial injury might be a reaction to chemicals (tweezers dipped in alcohol or strong disinfectant), leaving blood on the skin, or bite wounds.
- Bacteria then move in and the animal often bites or scratches at it until the skin is red and raw. C57BL/6 mice have a genetic tendency to develop severe dermatitis.

**Red skin rash. This is due to an allergic condition. It faded within 2-3 days and the skin was healthy**

**Ulcerative dermatitis**

**Severe ulcerative dermatitis with scabs**
Causes of subcutaneous edema include toxins, altered cardiovascular physiology, adverse reactions to test agents, kidney disease, etc.

Signs include fluid gathering in the skin layer of the entire animal, giving it a bloated appearance.

These two photos show the collection of fluid in the skin creating a bloated appearance. Although this mouse looks fat and probably weighs a lot, it is actually very thin due to its illness.

Cataracts are a clouding of the lens of the eye, and make the eye appear cloudy and white.

There is no indication of pain, discharge, or sensitivity to light.

Old animals commonly develop cataracts but some strains have a genetic tendency to develop them at a young age.
Some strains of mice (especially C57BL) have a genetic tendency to be born with a very small eye globe (microphthalmia) or no eye globe (anophthalmia).

The eyelid slit is still present but remains closed since there is little or no eye globe behind it.

One or both eyes may be affected.

Microphthalmia may be confused with 'squinting' due to bright lights

Various stages of microphthalmia
**EAR PROBLEMS**

- Often associated with parasitism, observing 'crustiness' of the external ear should also cause consideration of immune mediated diseases.

**EYE PROBLEMS**

- **Buphthalmia:** Generally considered a genetic condition, a prolapsed orbit may also be caused by tumor growth or significant physiologic changes in the animal.
FOOT PROBLEMS

- **PODODERMATITIS** or **SORE HOCKS** may be the result of poor cage sanitation and opportunistic organisms
- **LEG INJURIES** may be caused by cage or cagemate trauma

FUR LOSS

- **Barbering** occurs when animals chew on each other’s hair.
  - The skin is uninjured.
  - Often all of the animals will be affected except the ‘barber.’
    - Cage mate barbering: Usually is seen on the back between the shoulder blades or on the top of the head.
    - Auto-barbering: Usually seen along the flanks or low on the hind quarters.
  - Most likely initiated by the abnormal environment of cage living (behavior), but could be nutritionally related or due to pain or distress.
- **Hormone induced fur loss:**
  - This IS NOT Barbering
  - Key: symmetrical bilaterally (and places where the animal cannot reach)

- **Parasite caused fur loss**
  - Patchy, scaly, potentially a distressful condition
  - May be zoonotic!!!
Hydrocephalus (water on the brain) is common in some lines of rat and mice and is an inherited disease. The brain fluid does not circulate normally and pressure builds up that swells the head and compresses the brain. The head is domed with small eyes and the animal is sluggish. Usually it is noticeable by 2-3 weeks of age.

Hydrocephalus

Head tilting can occur due to trauma, neurologic disease, parasites, etc. May interfere with normal physiology (can’t eat?) May take time to observe (not a quick look diagnosis)
Malocclusion refers to overgrowth of the incisor (front) teeth in rodents. Rodent teeth grow throughout life, but normal teeth meet and wear each other down. May be noticed when an animal becomes thin because; if saliva appears on the chin; or the teeth will appear out of line. The condition is genetic and affected animals should be removed from the breeding colony.
PEG TEETH … nope, its normal … for rabbits

WET NOSE may mean nothing …
- Clear discharges may be nothing …
- Yellow or cream discharge probably means disease
- Wiping on fore paws a good place to look for signs of disease
Harderian Gland

Porphyrin
• reddish pigment

Hypersecretion
• caused by stress
• ‘red tears’

RED TEARS

- Chromodacryorrhea
  - Red discharge from the eyes or nose that looks like blood.
  - Originates from the tear gland (the Harderian gland).
  - Is normally groomed away.
  - Is an indication of general stress due to any reason (illness, injury, uncomfortable environment, etc).
  - May see red paws when the rodent rubs its’ eyes or nose.
SKIN PROBLEMS

- **SCALY SKIN DISEASE**: A skin condition often caused by a bacteria (Corynebacterium bovis) that only affects nude mice, although haired mice can carry it.
  - It is very contagious and hard to get rid of.
  - The skin is dry with small white or yellowish flakes.
  - Dry skin may also occur on sick mice that don’t groom themselves.

![Scaly skin disease](image1)

![Dry skin due to illness](image2)

- **BROKEN SKIN**: May occur for any number of reasons
  - Fight wounds
  - Poor surgical closure
  - Overcrowding
  - Same sex housing depending upon species
  - Bacterial agents

![Broken skin due to reasons](image3)
SKIN PROBLEMS

- Normal post shaving new hair growth – not a problem!

HUMAN ERROR

- Smart people do occasionally do dumb things …
- Smart people may not see what they think they see …
- Caging materials are built according to species; choose products that work together!!!
A **vaginal prolapse** is when tissue is protruding from the vagina of the female mouse.
- Prolapsed tissue is often red and irritated and may bleed.
- It can be due to straining (when pups are born), bladder infection, or have an unknown cause.
- The mouse should not be used for breeding since subsequent prolapses may involve the whole uterus.

A **rectal prolapse** is when tissue is protruding from the rectum of either sex.
- Prolapsed tissue is often red and irritated and may bleed.
- May be due to an intestinal infection (e.g. *citrobacter*), parasites, constipation, birthing, or a inherited tendency.
**RUFFLED FUR**

- Ruffled, unkempt fur is a sign the animal is not grooming itself.
  - The fur may look spiky or wet and is often accompanied by a hunched posture.
  - It usually indicates that the animal does not feel well for some reason.
- Some strains—especially rats—normally get ruffled fur with old age.
- Often ruffled fur is associated with a hunched appearance.

**Fur ruffled due to pain of leg injury**

**Ruffled fur due to old age and obesity**

**3 week old rat pup ill with water on the brain**

**Normal ruffled fur of young nude rats**

**RUNTING**

- A runt is visibly smaller and weaker than its littermates.
- This is not uncommon with large litters where not all pups get enough milk.
- If the whole litter is runted it usually is an indication of a problem with the mother or a disease.

**A normal 4 week old nude mouse and a runted littermate**

**These 3 week old BALB/c mice are from the same litter. The runted one is not only smaller, but also has delayed hair growth**
Staining of a rodent’s fur is most commonly due to urine or diarrhea. 
Diarrhea can be an indication of serious disease.

Urine stain on weanling

Severe urine staining of weanling. Note irritation to the genital area

The problem in the mouse above was gone in one week

Nope … its normal.
WET TAIL … ileal hyperplasia

- Swellings of any kind may be observed, and any location on the body.
- Location of the swelling may suggest an etiology:
  - Swellings in the ventral neck are usually associated with swollen lymph nodes.
  - Swellings all over may be lymphoma
- It's normal!!!

**RINGTAIL in rodents**
- Associated with low humidity
- Is permanent annular constriction
TAIL PROBLEMS

- TAIL INJURY in rodents
- Associated with poor handling
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