## Introduction

Traditionally, rats and rabbits are the species of choice for developmental toxicity (embryofetal) studies. However, if these species are found unsuitable the choice of an alternative can be difficult. One alternative is the minipig, and the use of the minipig as a non-rodent in developmental toxicity testing is increasing. Several studies have now been performed in minipigs, and at LAB Scantox, we have a database that comprises data from 70 control Göttingen SPF minipig dams from 6 different studies and all 308 control fetuses regarding incidences of variations and anomalies. This database is essential for interpretation of the results from an embryofetal teratology study. Experiments have shown that the minipig is suitable to teratogenic effects of tretinoin (Jørgensen, K.D. 1998).

### Variations and anomalies

#### Skeletal anomalies

- **Vertebrae**
  - Incomplete ossification of cervical arch: 13 (4.2%)
  - Incomplete ossification of lumbar centrum: 18 (5.8%)
  - Incomplete ossification of thoracic centrum: 24 (7.8%)
  - Incomplete ossification of thoracic arch: 38 (12.3%)
  - Incomplete ossification of cervical centrum: 13 (4.2%)
- **Unossified ossification center distal of fibula**: 23 (7.5%)<br>**Unossified ossification center proximal of humerus**: 18 (5.8%)
- **Incomplete ossification center proximal of humerus**: 21 (6.8%)
- **Incomplete ossification center distal of fibula**: 30 (9.6%)
- **Incomplete ossification of the following bones**: central hyoid, cervical arches, cervical centrum, cervical processus spinothoracic, thoracic arches, thoracic centrum, thoracic processus spinosus, lumbar centrum, ossification center distal of fibula, ossification center proximal of humerus, ossification site proximal of proximal(s), ossification site(s) distal of metacarpal(s), and tarsal bones.

#### Visceral anomalies

- **Lumbar lamina**: 1 (0.3%)
- **Brachial plexus**: 2 (0.6%)
- **Hexadactyly**: 2 (0.6%)
- **Extra distal**: 4 (1.3%)
- **Extra medial**: 3 (1.0%)
- **Absent ossification site cranial of proximal(s)**: 13 (4.2%)
- **More than one tarsal bone unossified on both legs**: 13 (4.2%)

### Material and Methods

- **Group size**: (embryofetal studies): 14-18 Göttingen SPF minipigs.
- **Primiparous mothers**: age 6 to 8 months.
- **Exposure**: Day 11.35 of gestation (organogenesis).
- **Body weight**: GD 10-11 = 20 kg (SD ± 3.4), GD 35 = 23 kg (SD ± 3.8).
- **Route of administration**: via oral route, subcutaneous injection, or intravenous injection via implanted vascular access port (VAP).
- **Fetuses**: Collected by caesarean section on GD 109-111.
- **Examination of fetuses**: external and visceral examination of fresh tissue at necropsy and skeletal examination of Alizarin stained bones. Heads from half of the fetuses were fixed in Bouin’s fixative, sectioned and examined for abnormalities and described mostly according to the terminology published by L.D. Wise et al., 1997.

### Results and Discussion

The database contains information on bodyweight gain, abortion rate, pregnancy rate, number of fetuses, number of early and late resorptions, number of implantation sites, total number of corpora lutea, uterine weight (including fetals and placental weight), preimplantation loss, postimplantation loss, fetal weight, placenta weight, nose to tip of tail length, nose to tail head length, and external, visceral and skeletal anomalies.

The data presented in the tables illustrate some of the variations and anomalies found in the minipig. A gestation period of 113 days and 5.3 fetuses/litter, and a litter size of 308, make the minipig a more suitable species to use compared to primates as an alternative species in embryofetal studies.

### References
