
UPDATE OF NEW IMAGES AND CATEGORISATION IN THE *DEVTOX* DATABASE

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OVERVIEW

- New images in *DevTox*
- Categorisation of anomalies
- Translation of *DevTox*

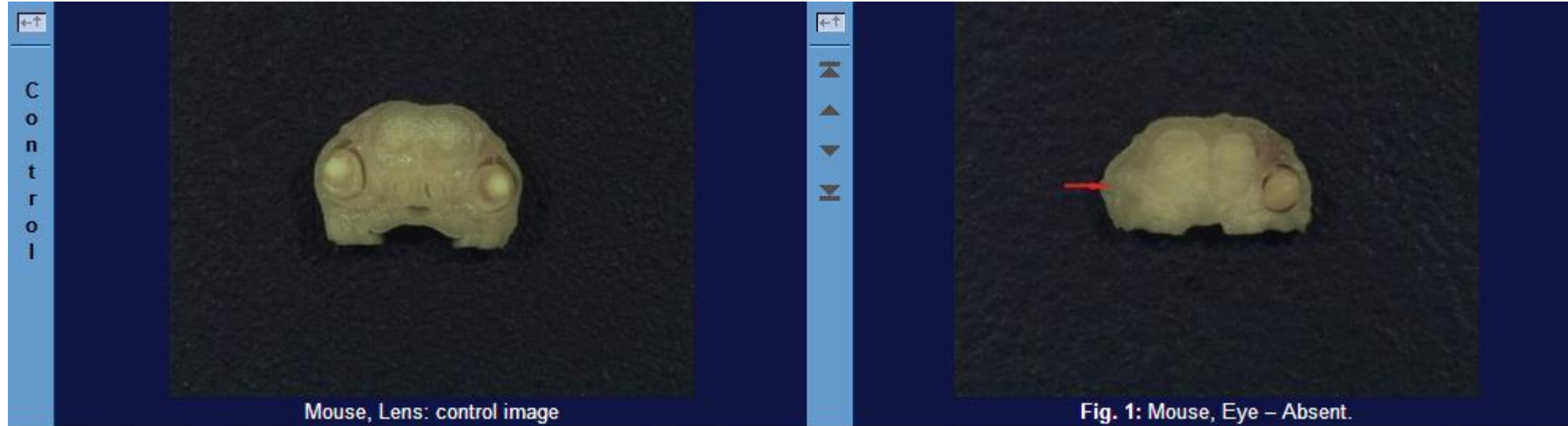
New Images in *DevTox*

- Visceral anomalies
 - Images supplied by Dr. Jingying Hu, Shanghai
 - Selected to represent hitherto unillustrated anomalies
 - 33 new images on anomalies and additional control images

- Result: Total of 212 images on visceral anomalies

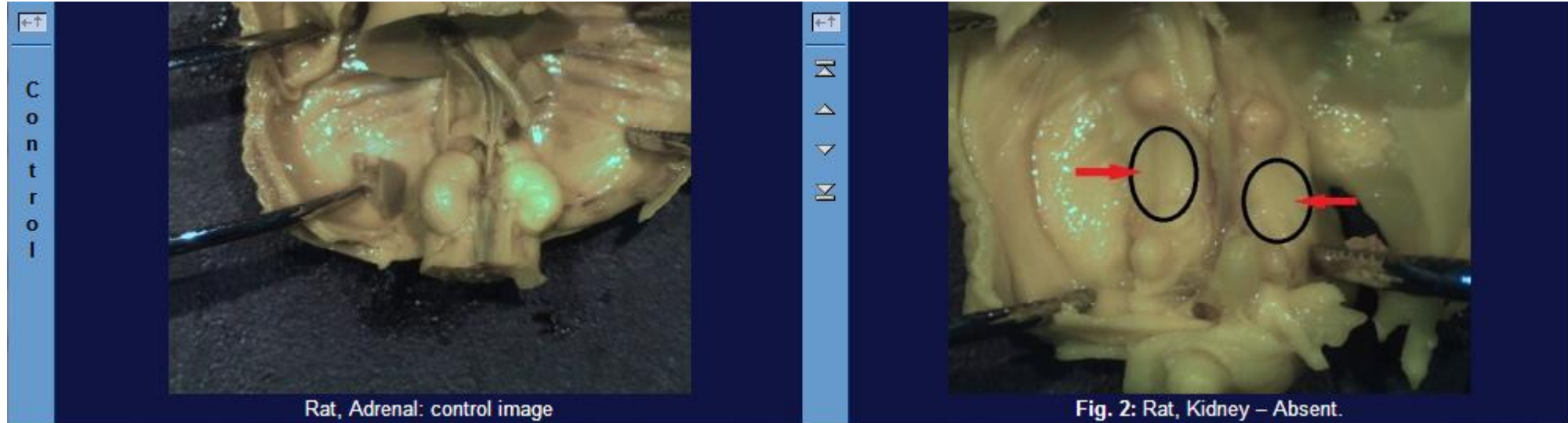
Examples for New Images

- Eye – Absent
 - First example in the mouse



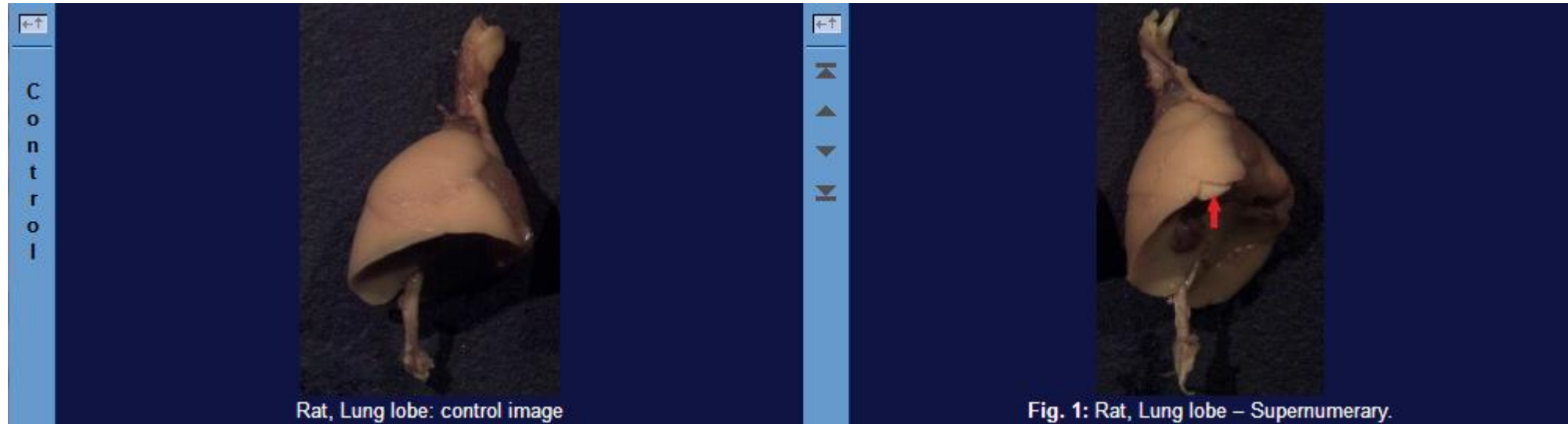
Examples for New Images

- Kidney – Absent
 - First three examples in the rat (see one below)
 - First example in the mouse



Examples for New Images

- Lung lobe – Supernumerary
 - First example in any species (rat)



Categorisation of anomalies

- Terminology of developmental anomalies (version 2)
- According to Makris et al. 2009
- Categorisation in previous terms preserved
 - Malformation ■ M
 - Grey zone anomalies ■ G
 - Variation ■ V
- Many terms “not classified”



Terminology of developmental abnormalities in common laboratory mammals (version 2)^{☆,☆☆}

Susan L. Makris^{a,*,1,4}, Howard M. Solomon^{b,1,4}, Ruth Clark^{c,2,4}, Kohei Shiota^{d,3,4},
Stephane Barbellion^{e,2}, Jochen Buschmann^{f,2}, Makoto Ema^{g,3}, Michio Fujiwara^{h,3},
Konstanze Grote^{i,2}, Keith P. Hazelden^{j,1}, Kok Wah Hew^{k,1}, Masao Horimoto^{l,3},
Yojiro Ooshima^{m,3}, Meg Parkinson^{n,2}, L. David Wise^{o,1}

Example from *DevTox*

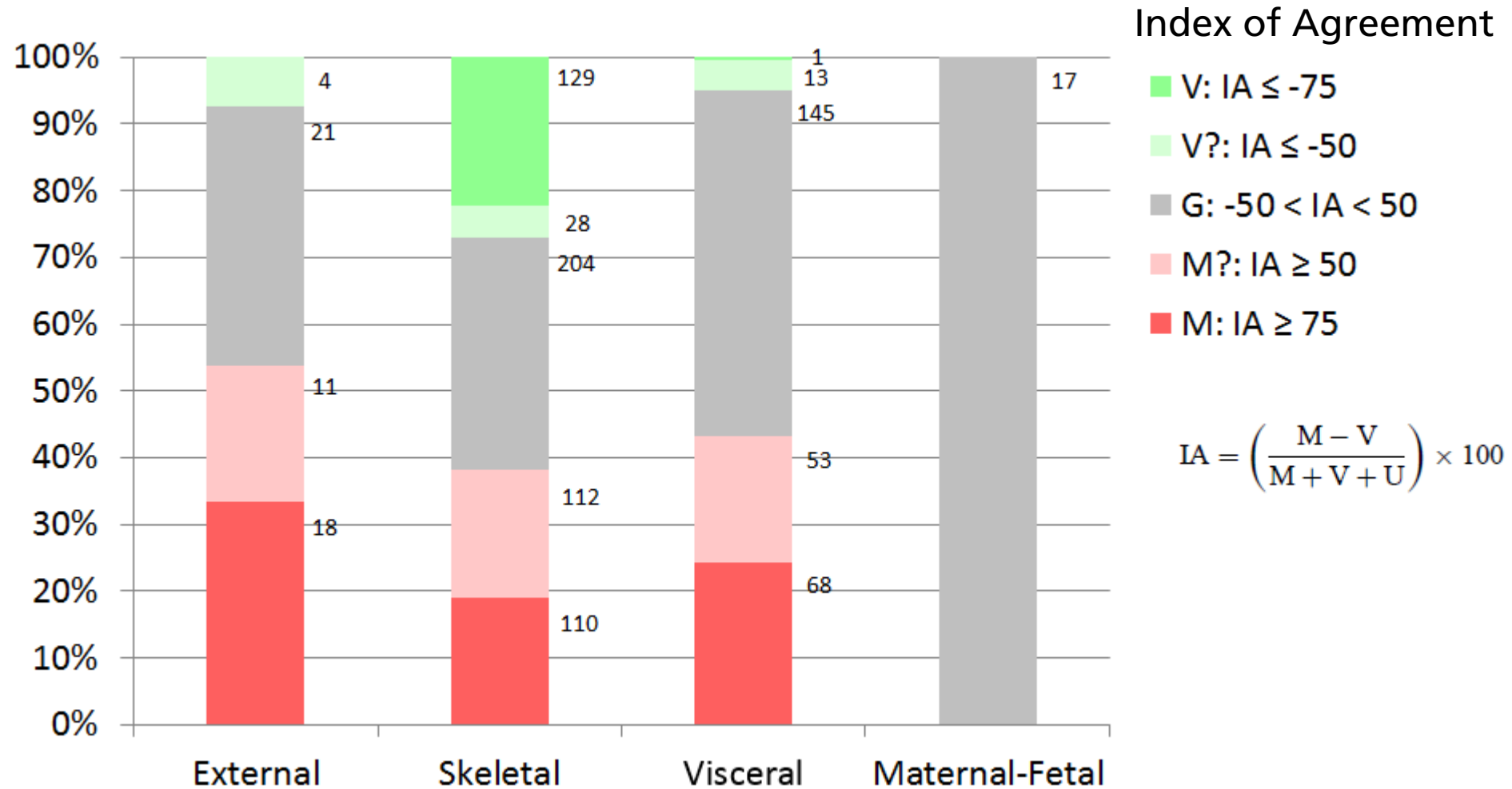
Skeletal Findings: Mandible [Status of 2012]

Mandible	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Absent	—	—	—	—	—	—	—	—	—
Bent	—	—	—	—	—	—	—	—	—
Fused	—	—	—	✓	—	—	—	—	—
Hole	—	—	—	—	—	—	—	—	—
Incomplete ossification	✓	—	—	—	—	—	—	—	—
Increased ossification	—	—	—	—	—	—	—	—	—
Isolated ossification site	—	—	—	—	—	—	—	—	—
Large	—	—	—	—	—	—	—	—	—
Long	—	—	—	—	—	—	—	—	—
Malpositioned	—	—	—	—	—	—	—	—	—
Misaligned	—	—	—	—	—	—	—	—	—
Misshapen	—	—	✓	—	—	—	—	—	—
Short	✓	—	—	—	✓	—	—	—	✓
Single incisor socket	—	—	—	—	—	—	—	—	—
Small	✓	—	✓	—	—	—	—	—	—
Splayed	—	—	—	—	—	—	—	—	—
Supernumerary	—	—	—	—	—	—	—	—	—
Supernumerary site	—	—	—	—	—	—	—	—	—
Thick	—	—	—	—	—	—	—	—	—
Thin	—	—	—	—	—	—	—	—	—
Unossified	—	—	—	—	—	—	—	—	—
Unossified area	—	—	—	—	—	—	—	—	—

Symbols:
 ①: Rat (Ra)
 ②: Mouse (Mo)
 ③: Rabbit (Rb)
 ④: Hamster (Ha)
 ⑤: Primate (Pr)
 ⑥: Guinea Pig (Gp)
 ⑦: Minipig (Mp)
 ⑧: Dog (Do)
 ⑨: Bird (Bi)
 — : absent in species
 — : malformation
 — : present
 — : variation
 — : not classified
 ✓ : image(s) available
 P : post-natal image(s) available

- Survey in 2013 to fill the gaps
 - External: 54
 - Skeletal: 567
 - Visceral: 273
 - Maternal-Fetal: 17
- 20 questionnaires from experts / expert groups

Result of the Survey in 2013



Implementation of the Categorisation in *DevTox*

- Most classifications added according to the Survey: 932 anomalies
- Slight modifications of the results of the Survey
 - Discussion at 8th Berlin Workshop in 2014
 - Visceral anomalies:
 - Posterior (caudal) vena cava - Branching variation
 - Subclavian artery - Branching variation

Subclavian artery	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Absent			✓						
Branching variation									
Dilated									
Malpositioned									
Narrow									
Retroesophageal		✓	✓						
Supernumerary									
Supernumerary branch									

Symbols:

- ①: Rat (Ra)
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- ⑥: Guinea Pig (Gp)
- ⑦: Minipig (Mp)
- ⑧: Dog (Do)
- ⑨: Bird (Bi)
- : absent in species
- : malformation
- : grey zone
- : variation
- ✓ : image(s) available
- P : post-natal image(s) available

Example from *DevTox*

Skeletal Findings: Mandible [Current Status]

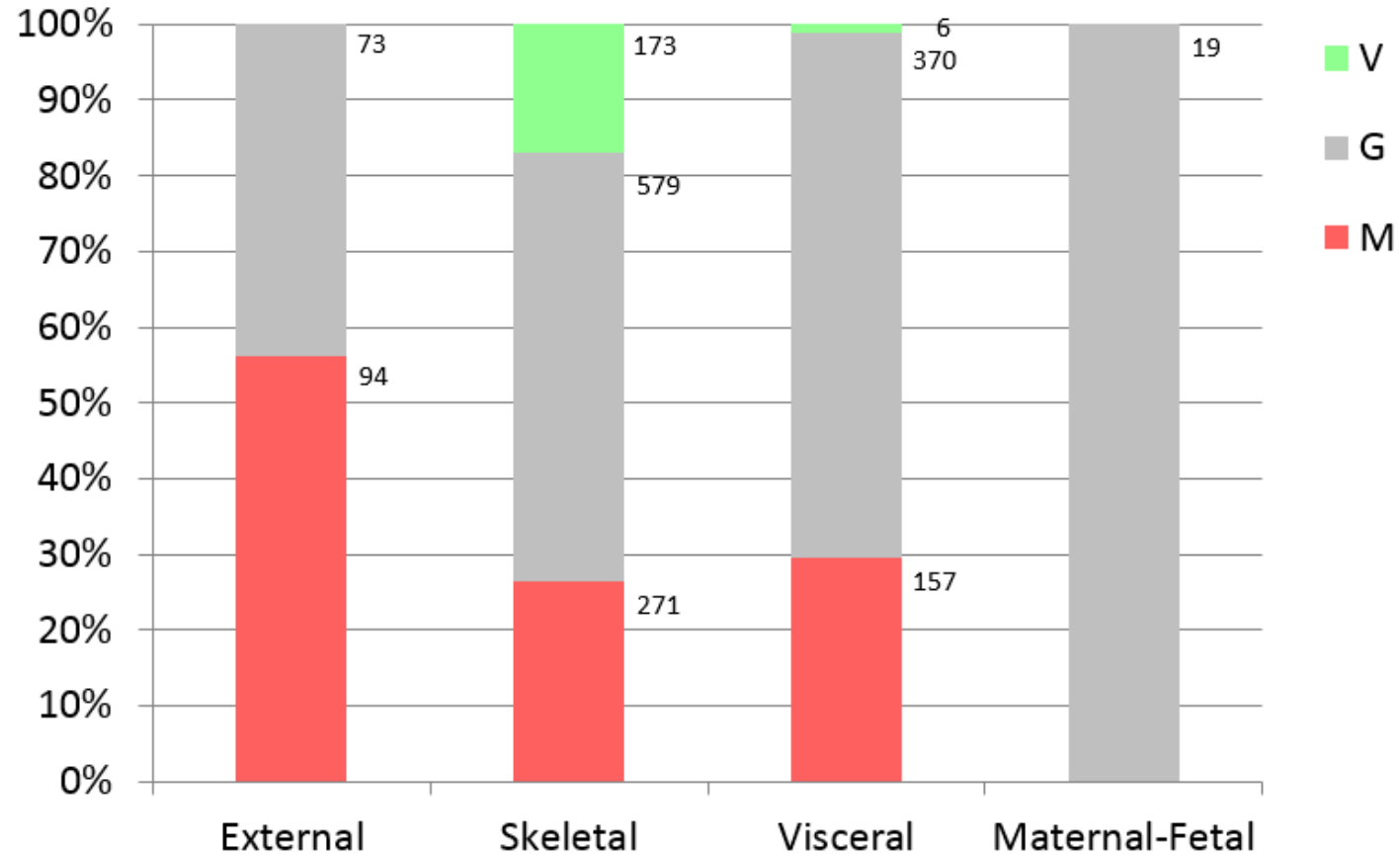
Mandible	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Absent									
Bent									
Fused				✓					
Hole									
Incomplete ossification	✓								
Increased ossification									
Isolated ossification site									
Large									
Long									
Malpositioned									
Misaligned									
Misshapen			✓						
Short	✓			✓					✓
Single incisor socket									
Small	✓	✓							
Splayed									
Supernumerary									
Supernumerary site									
Thick									
Thin									
Unossified									
Unossified area									

Symbols:

- ①: Rat (Ra)
- ②: Mouse (Mo)
- ③: Rabbit (Rb)
- ④: Hamster (Ha)
- ⑤: Primate (Pr)
- ⑥: Guinea Pig (Gp)
- ⑦: Minipig (Mp)
- ⑧: Dog (Do)
- ⑨: Bird (Bi)
- : absent in species
- (red): malformation
- (grey): grey zone
- (green): variation
- ✓: image(s) available
- P: post-natal image(s) available

Mandible	2012	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Absent										
Bent										
Fused					✓					
Hole										
Incomplete ossification	✓									
Increased ossification										
Isolated ossification site										
Large										
Long										
Malpositioned										
Misaligned										
Misshapen			✓							
Short	✓				✓					✓
Single incisor socket										
Small	✓	✓								
Splayed										
Supernumerary										
Supernumerary site										
Thick										
Thin										
Unossified										
Unossified area										

Summary of Current Categorisations in *DevTox*



Translation of *DevTox*

Translation into Chinese version

- Proposed at the 8th Berlin Workshop in 2014
- Preparation of templates in autumn 2014
- Translation in China (Dr. Weihua Li)
 - Shanghai Institute of Planned Parenthood Research
 - WHO Collaboration Centre for Research in Human Reproduction
 - Fudan University
- Translated files in several lots from summer 2015 to spring 2016
- Implementation in the website
- Final checks at BfR (Dr. Wenna Xu)
- Release to the public in autumn 2016



Reduction of the Variety of Text Sources

Original English version

- Text files (HTML)
- PHP program scripts (Server)
 - Access database and arrange pages
- Database tables
- JavaScript programs (Browser)
 - Build e.g. menus
- Button icons with info



Modified English version

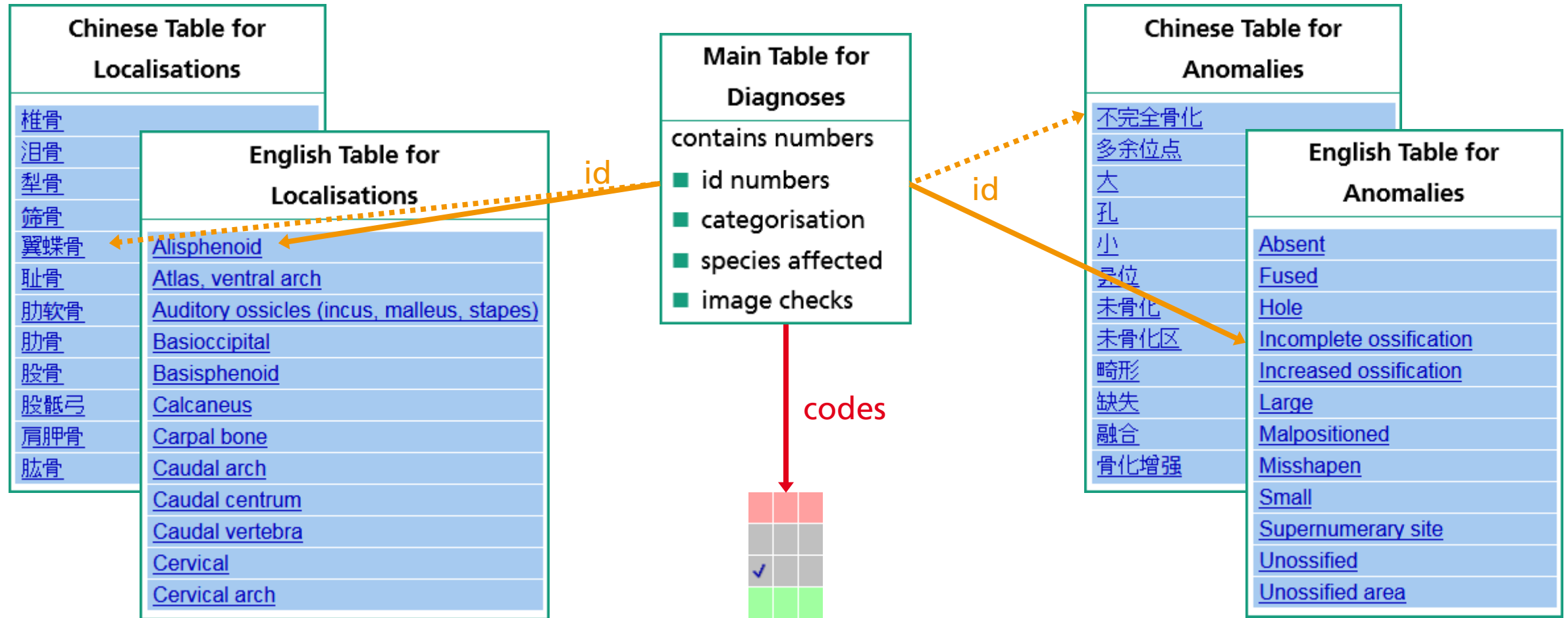
- Text files (PHP)
- Database tables

Programs are still active but do not contain any text information displayed on screen

Example DevTox General Pages: Background

The image displays two side-by-side screenshots of the DevTox website. The left screenshot shows the English version of the 'Background' page. The right screenshot shows the Chinese version of the same page. Both pages have a blue header with the DevTox logo and the text 'A Resource for Developmental Toxicology'. The English version has a navigation menu with options like '.Background', '.Nomenclature', '.Data', and '.Masthead'. The Chinese version has a similar menu with options like '.背景', '.术语集', '.数据', and '.发行机构'. The main content area of both pages discusses the 'DevTox database' and its purpose in promoting harmonization and standardization of nomenclature for hazardous chemicals. The Chinese version includes a sidebar with a 'DevTox 术语集' section containing a list of links: '背景', '启动DevTox.nom', '下载', '提交图片', and '链接'.

Internal Structure of the Database



Home Index Locations Findings Manuscript Comments ? DevTox Ra Mo Rb Ha Pr Gp Mp Do Bi

Rib – Fused Skeletal finding M

Synonym(s): Cartilaginous fusion
 Non-preferred term(s): –
 Definition:
 Joined or blended together

Fig. 7: 7 day p.n.
 Rib fused
 Additional finding: Thoracic centrum Bipartite ossification, Fused, Malpositioned



Example Rib – Fused

主页 解剖学定位 结果 文本 评论 ? DevTox Ra Mo Rb Ha Pr Gp Mp Do Bi

肋骨 – 融合 骨骼结果 M

Rib – Fused

同义词: 软骨融合
 非首选术语: –
 定义:
 连接或融合在一起
 注释:
 详细说明融合的结构

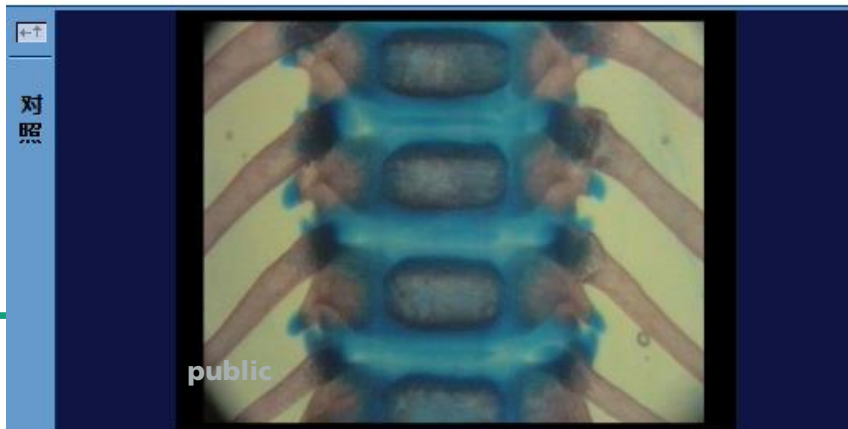
图片 5:
 其他发现: 第13胸椎腹侧骨化中心双位点骨化, 额外第14肋骨

图片 6: –

图片 7: 妊娠第7天
 肋骨融合
 其他发现: 胸椎体双位点骨化, 融合, 异位







大鼠, 肋骨: 对照图片



图片 7: 大鼠, 肋骨 – 融合.

Conclusions About the *DevTox* Translation

- Structural rearrangements behind the scenes
 - Texts separated into a few files and the database tables (one devoted to global character strings)
 - Switch to different character set (UTF-8)
 - Programs modified to include the new resources
- [Translation of all texts]
- Implementation
 - Additional tables for new language
 - Programs for filling those new tables
 - Selection of additional language on the website
- Updates need to be considered