Anatomy notes for Mouse Atlas model EMA21

ANNOTATIONS ON ARBITRARY BOUNDARIES OF TISSUES:

GENERAL REMARKS:

The delineation of tissue boundaries is based on cell shape and configuration as seen in the original sections under a microscope. Where it was not possible to base boundaries on these grounds, we tried to look in other planes in the digital model. In a few cases, this led to an unambiguous boundary e.g. for the somites. However, in the majority of the cases in which boundaries could not be discerned in the original sections, decisions had to be based on other criteria than cell shape and configuration; we call these 'arbitrary' boundaries. Arbitrary boundaries are generally based on 3-dimensional shape, for example, division between the branchial arch and the rest of the embryo.

In this document we list the tissues with arbitrary boundaries and the grounds for each decision. The tissues are listed alphabetically in bold under the main components in the anatomy database. Tissues adjacent to the arbitrary boundary are displayed in italics if they are part of a different component in the anatomy database. Boundaries which, though based on cell shape and configuration, were doubtful are also listed.

EMA21, THEILER STAGE 12: Domain annotation table

embryonic/extraembryonic painting .	*Note that all the painting was done on the basis of the original transverse sections, so the comments should be considered from that viewpoint*
Lumens:	Each intraembryonic lumen that is formed gradually is included in intraembryonic space from the moment that the tissues that will enclose the lumen start to rise. The lumen will thus be bordered by the shortest line (in the transverse section plane) between the tips of the tissues that will fuse to enclose it. An example is the lumen of the forming neural tube. This comment applies to: neural lumen, peritoneal cavity, gut lumen. Lumina that will never be fully enclosed are not

		considered to be intraembryonic.
	Boundary between the embryo and the allantois	This is arbitrary and was constructed by extrapolating the boundary of the embryo just anterior and posterior to the allantois.
body cavity	**Cavities of peritoneum, pericardio-peritoneal canals and pericardiac cavity**	Division between these parts based on 3D shape and location of th**e heart** and the **septum transversum.**
	***Mesothelial lining of peritoneum, pericardio-peritoneal canals and pericardiac cavity**	Based on the boundaries of the cavities of these components.
head-body division	**somites**	The first four visible somites are thought to be **occipital somites**. This assumes that the first, transient somite has disintegrated.
	Nervous tissue (future brain and future spinal cord):	Based on the division of **future brain** and **future spinal cord** according to our assessment of position in the embryo as a whole and morphology of the **neural tube**. This boundary is approximate. Correlation with gene expression patterns and other data will be required to determine the true position of the 'head/body' boundary
	Mesenchyme	Based on the division of the somites into head- and body somites
heart		
	Cardiac jelly and endothelium of different parts of the heart:	Boundaries designed to follow the boundaries of the wall of the heart, unless otherwise state
	Wall:	Boundary with **septum transversum** based on difference in cell compaction.
		Boundary with **mesothelial lining of pericardio-peritoneal canals** based on 3D shape and a possible slight difference in cell compaction.
		Boundary with **sinus venosus**: Cranial end of sinus venosus ends where the **lumen of the common atrium** splits into

	Endothelial lining:	two parts. Boundary with **mesothelial lining of pericardiac cavity** defined by both the extension of **cardiac jelly** and 3D shape of the wall and **mesotheilial lining of pericardiac cavity**
mesenchyme:	**Intermediate mesenchyme:**	Condensed mesenchyme between **somites** and **lateral plate mesenchyme**. Where it has differentiated into two parts, the medial part is labelled as **nephrogenic cord** and the lateral part as **presumptive nephric duct**.
	Splanchnic / somatic, lateral plate mesenchyme:	Medial extension of the **splanchnopleure-** and **somatopleure-derived mesoderm** is defined by the extension of the **mesothelial lining of the peritoneum**. We have divided the **lateral plate mesenchyme** from the **head mesenchyme** at caudal level of the **pericardial-peritoneal cana**l.
	Paraxial mesenchyme:	**Mesenchyme medial to the** lateral plate mesenchyme, caudal to the **somites** and rostral and lateral to the **primitive streak**.
	Intercellular space:	Those spaces between and around **somites** and **intermediate mesoderm** that may result from shrinkage during fixation.
	notochord:	We based the presence of a **notochord** on a distinctly different cellular organisation from the adjacent future **neural tube**. If there is no different organisation of cells the area was defined as **primitive streak**. Boundary between **notochord** and surrounding mesenchyme was based on cell arrangement.
	somites:	Most caudal site of radial cell organisation on microscopic

	level defined as the **last-formed somite**.
vascular system:	All boundaries between different parts based on 3D shape only