

**ASSESSMENT FOR CERTIFICATION OF COMPETENCE IN
FETAL MORPHOLOGICAL EXAMINATION**

**LABORATORY LITTER ASSESSMENT – FRESH EXTERNAL
AND VISCERAL EXAMINATION**



**THE INTERNATIONAL REGISTER OF FETAL
MORPHOLOGISTS**

LABORATORY LITTER ASSESSMENT - FRESH EXTERNAL AND VISCERAL EXAMINATION

Name of Candidate: Stephanie Rayhon

Name of Applicant (Laboratory):	Stephanie Rayhon, Bristol-Myers Squibb, Princeton, New Jersey
Examination type assessed (species):	FRESH EXTERNAL AND VISCERAL EXAMINATION: Rat
Date of assessment:	November 12, 2014
Names of assessors:	Stacia Murzyn, David Schreur

Specimens used for assessment: [insert Study code, litter and fetus ID in each box]

FETUS #1	FETUS #2		
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Key for abbreviations:

P - Needed prompting

PP - Needed frequent prompting

N - Nervous

VIP - Volunteered information previously

DK - Didn't know the answer

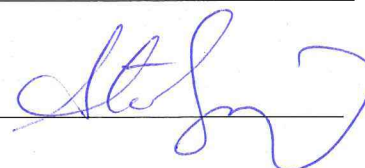
NC - Not consistent in technique

Assessor's Summary:

[delete or underline to highlight the appropriate description from the options below:]

Competent / competent and focussed / engaged and focussed during the assessment, and demonstrated / effectively communicated a sound knowledge / an impressive understanding / of all aspects

Assessor signatures



Date

12 Nov 2014

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COMMENTS FROM LABORATORY SPECIMEN EXAMINATION: [insert free text in boxes]

Talk through/procedure

Question	Acceptable Response	Response
Describe to me what you are doing; what do you see; what are you looking at?	<u>Separation</u> <u>Moving</u> <u>Dissecting/clearing</u> <u>Turning specimen</u> <u>Examination from all sides</u> <u>Manipulation for clarification</u>	<p>Turns fetus to see from all sides. opens mouth to examine palate, tongue. looks at abdominal viscera in situ. examines diaphragm prior to opening thoracic cavity. opens to level of thorax. check size & shape of limbs. checks for abnormal flexure. checks digits. checks tail & anus.</p>
What are you looking at now? <i>Kidney</i> Describe what you see		<p>Look normal, ureters look normal. vessels look good.</p>
Note how candidate is recording observations - as they are found or at the end of the examination?		<p>Record as found, immediately so that it is accurate to what is seen.</p>
Confirm that specimen is being manipulated appropriately.		<p>The specimen is well and properly manipulated.</p>

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Consistency in procedural routines

Question	Acceptable Response	Response
Can you think what the importance of consistency in magnification across examiners might be?	Consistency is important so that all examiners see and record to the same level of detail.	Yes, important to keep perspective the same to ensure you see things the same way
Do you always use the same sequence and routine for examination? Why do you think that it is important?	Yes - don't miss anything, important for pattern recognition, subconscious alert.	Yes
Do you think it is necessary to look at structures from more than one aspect?	Yes - gain clear view of 3D structures, enable all structures/aspects of structures to be seen clearly.	Yes, need to see all structures, any attachments
Which structures would you examine in situ before you go on to disturb the viscera?	E.g. position of heart in thorax, thymus, cranial vena cavae, diaphragm before thorax is opened, ureters before sectioning kidney, eye bulge	V.I.P.

Terminology and recognition levels used

Question	Acceptable Response	Response
How do you ensure other examiners are using the same terms as you for the same observation?	User guides and recognition levels	used references, glossary in proventus program
How do you decide whether or not to record observations?	Discuss with colleagues Reference material, user guides, laboratory recognition levels, background data	
What could you do to make sure that you've chosen the most accurate term?	Peer review/consistency check (examiner records should be traceable)	

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Terminology and recognition levels used

Question	Acceptable Response	Response
Would you assign a severity level, why?	User guides and recognition levels	DOES NOT ASSIGN SEVERITY TO OBSERVATIONS IN THEIR LABORATORY
How do you ensure other examiners are using the same severities as you for the same observation?	Discuss with colleagues Reference material, user guides, laboratory recognition levels, background data Peer review/consistency check (examiner records should be traceable)	

Recognition of artefacts

Question	Acceptable Response	Response
How would you decide if real or artefact?	Is the structure an unusual colour (<u>haemorrhage</u>)? Background knowledge/experience Refer to PM data (specimen dropped?)	LOOK TO SEE IF TORN OR CUT, ASK ANOTHER TECHNICIAN CONSULT REFERENCE CHECK RUN SMOOTH ON MOUTH EDGE
What procedural errors are likely to lead to artefacts?	Unsuitable mode of death (e.g. too much pentobarbitone or <u>inappropriate site for injection</u>) Flattening on one side of head or apparent forelimb flexure due to the way it was laid on tray/bench <u>Digit/tail/pinna damage - cut edge, evidence of bleeding</u> <u>Blood vessel damage, trace the route to find each end</u>	COULD OVER HANDLE OR CUT AT WRONG ANGLE COULD CREATE A HOLE WITH FORCEPS EXTERNALLY COULD BE BAVISED BY HANDLING COULD PULL UMBILICUS AND CREATE SOMETHING THAT LOOKS LIKE OMPHALOCELE
Can you think of any observations which could be caused by an artefact?	Missing digits/tail/pinna, Intraabdominal/hepatic/sub cutaneous haemorrhage, umbilical hernia, forceps damage to palate	SEVERED LIMB OR TAIL V. I. P.

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Recognition of artefacts

Question	Acceptable Response	Response
Would you record artefacts?		if it may affect another examination,
How would you record an artefact?	Explain how	would document it as a comment

Correct identification of anomalies

Question	Acceptable Response	Response
What could you do to make sure that you've chosen the most accurate term?	<u>Discuss/review findings with colleagues; refer to recognition levels/user manuals/training/reference material/background data.</u>	
Why have you used that term? (any observation with a recognition level, relative to the norm)	Give reason based on degree of displacement, normal variation. Based on symmetry; alignment; position in relation to other structures, normal variation	
How would you decide if you thought one pinna was displaced?	Give reason based on <u>degree of displacement, normal variation, alignment; position in relation to other structures, normal variation; compare to normal specimen</u>	
What anomalies might you see in the/state region? <u>LUNGS</u>	<u>MISSING (ABSENT) LOBES</u>	<u>DISCIRCULATION</u>
What anomalies might you see in the/ state region? <u>GREAT VESSELS</u>		<u>ABSENT GREAT & BRONCHIAL ABSENT VESSELS TRANSPOSITIONED VESSELS</u>
What anomalies might you see in the/state region? <u>LIVER</u> <u>ABDOMINAL</u>		<u>LOBULATIONS, ROUGH SURFACE, PRESENCE OF ALL LOBES</u> <u>ABSENCE OF INCISUS, DISCIRCULATION</u>

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Demonstration of knowledge of consequence of findings (choose minimum of 3 from this section)

What else might you see with:		
Absent pollex [at external observation]	Other short digits/absent claws	
Absent tail [at external observation]	<u>Imperforate anus</u> . Check stomach contents/presence of meconium, <u>patency of anus</u>	
Dilated ureter	<u>Renal pelvic cavitation</u> , large urinary bladder, kinked ureter	PROBLEMS WITH VASCULATURE
Short lower jaw	Large/small/protruding tongue, absent incisors, <u>size of oral cavity</u>	EYE BULGES, CLEFT PALATE
Distended abdomen	Fluid in abdominal cavity, <u>changes in size, shape, position and presence of great vessels</u> . Malrotated heart, formation of ventricular septum. Check stomach contents/presence of meconium, patency of anus. Form of <u>liver</u> , abdominal wall musculature, <u>umbilical vessels</u> .	ABNORMALITY OF KIDNEY OR HEART
Flat cranium / occipital projection	Spina bifida (open or skin covered)	
Skin lesion/haemorrhage cranium / dorsal midline	Meningocele/spina bifida (skin covered)	
Malrotated heart	<u>Changes in size, shape, position and presence of great vessels</u> . Formation of <u>ventricular septum</u> .	SENITAL DEFECT THICKENING OF WALLS CHANGES IN SIZE AND SHAPE OF CHAMBERS, CHANGES IN VALVES
Whole body oedema	Changes in size, shape, position and presence of great vessels. Malrotated heart, formation of ventricular septum. Form of liver, abdominal wall musculature, umbilical vessels. Kidney size and form (pelvic dilation,	

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Demonstration of knowledge of consequence of findings (choose minimum of 3 from this section)

What else might you see with:		
	enlargement), cleft palate.	
What would you expect to record in association with low fetal weight	Thin, <u>translucent, shiny fragile skin</u> , oedema over snout, domed cranium, apparent change in size of eye bulge, non-eruption of incisors, poorly defined digits, apparently larger genital papilla, difficulty in determining external sex. Lungs not expanded, <u>kidney - dilated pelvis/ureters</u> , testes high, pronounced umbilical vessels [Check day of PM if whole litter affected]	APPEARANCE OF DOMED HEAD DOESN'T WANT TO GO IN WITH A BIAF OBSERVATIONS IN THE KETUS ARE RECORDED BUT NOT BASED ON BODY WEIGHT
What might you find in association with high fetal weight	May be oedematous, thick skin, eruption of incisors [Check day of PM if whole litter affected]	
Dilated major blood vessel (aorta, pulmonary trunk)	Narrow/absent/malpositioned major blood vessel (aorta, pulmonary trunk), ventricular septal defect, malrotated heart, abnormal lung lobation, fluid in thoracic/abdominal cavities/oedema	

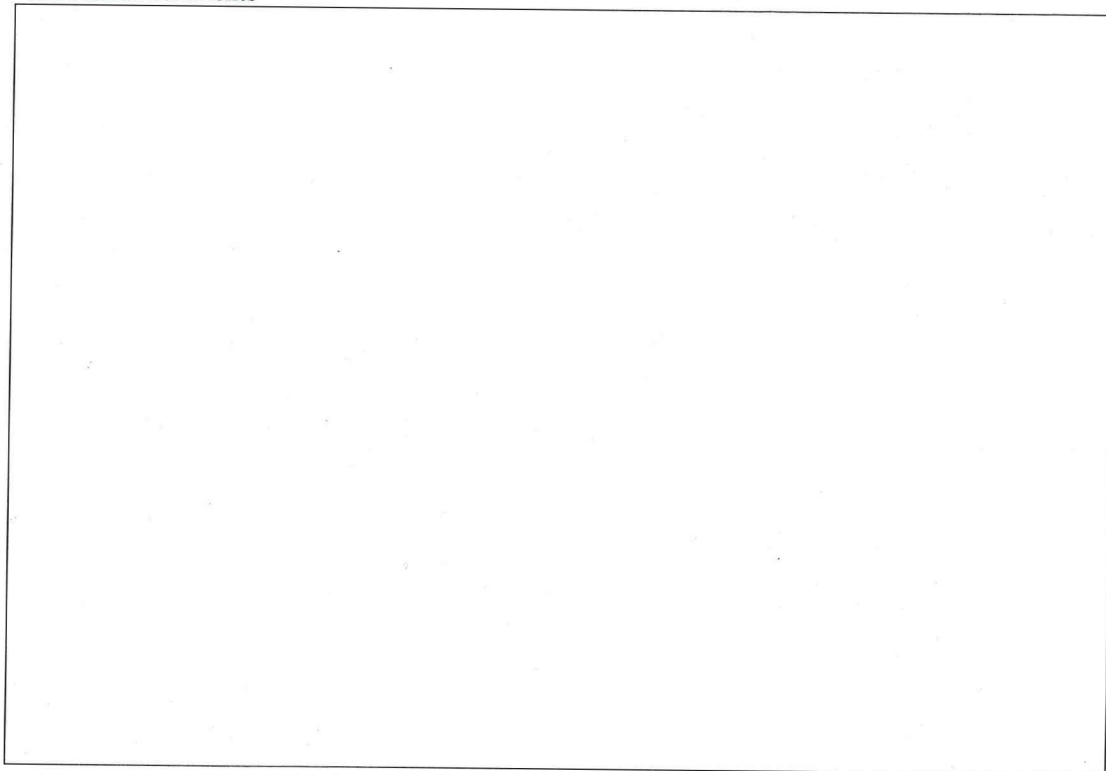
Awareness of importance of communication lines as reaction to unusual findings

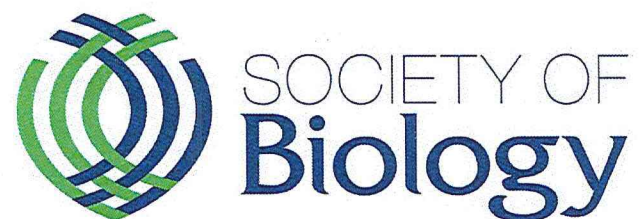
Question	Acceptable Response	Response
What would you do if you had never seen a finding before? What would you do if you were unsure how to describe an observation?	Describe what is seen, <u>discuss/review findings with colleagues</u> , refer to <u>recognition levels</u> /user manuals/ <u>training</u> /reference material/ <u>background data</u>	

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Additional comments





THE INTERNATIONAL REGISTER OF FETAL MORPHOLOGISTS

RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Name of Applicant (Laboratory):	Stephanie Rayhon, Bristol Myers Squibb, Princeton, New Jersey
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Examination type
assessed (species):

EXTERNAL AND VISCERAL RAT

Date of assessment:

November 12, 2014

Names of assessors:

Stacia Murzyn, David Schreur

Specimens used for assessment: [\[insert fetus ID in each box\]](#)

Image 1	Image 2	Image 3	Image 4	Image m	Image n
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Key for abbreviations:

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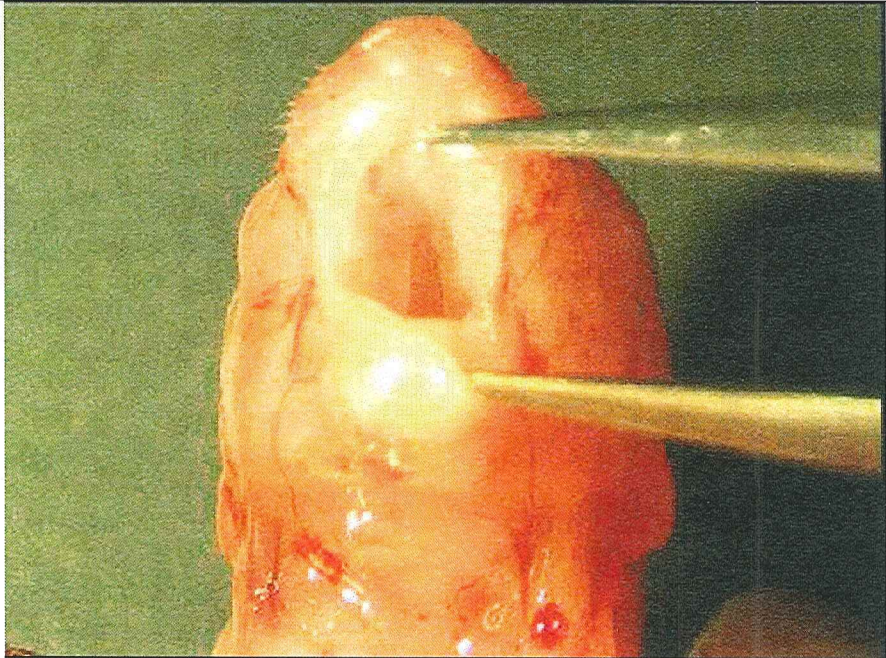
Assessor signature



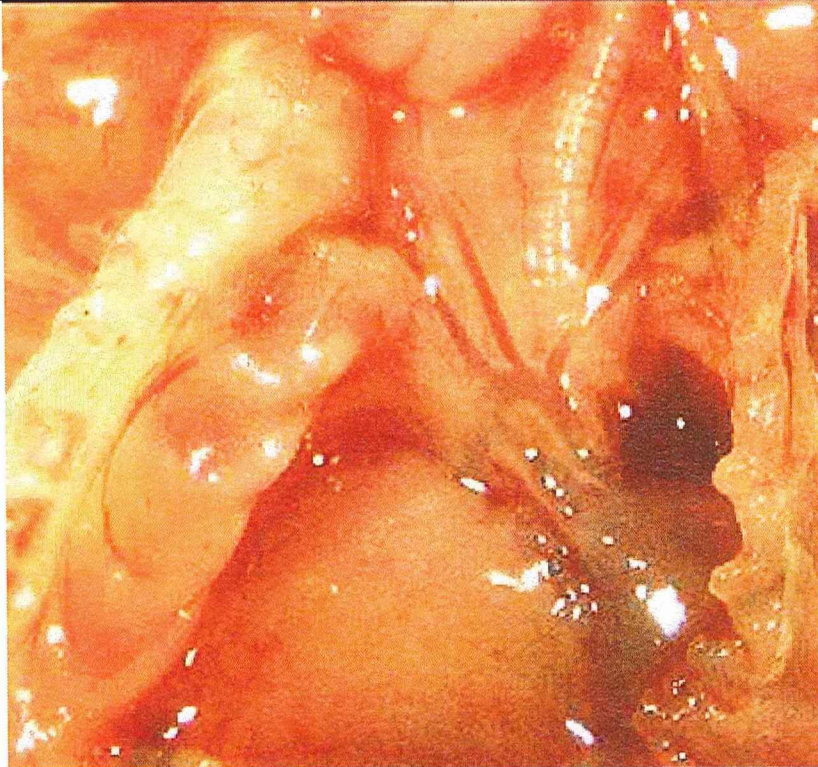
Date

12 Nov 2014

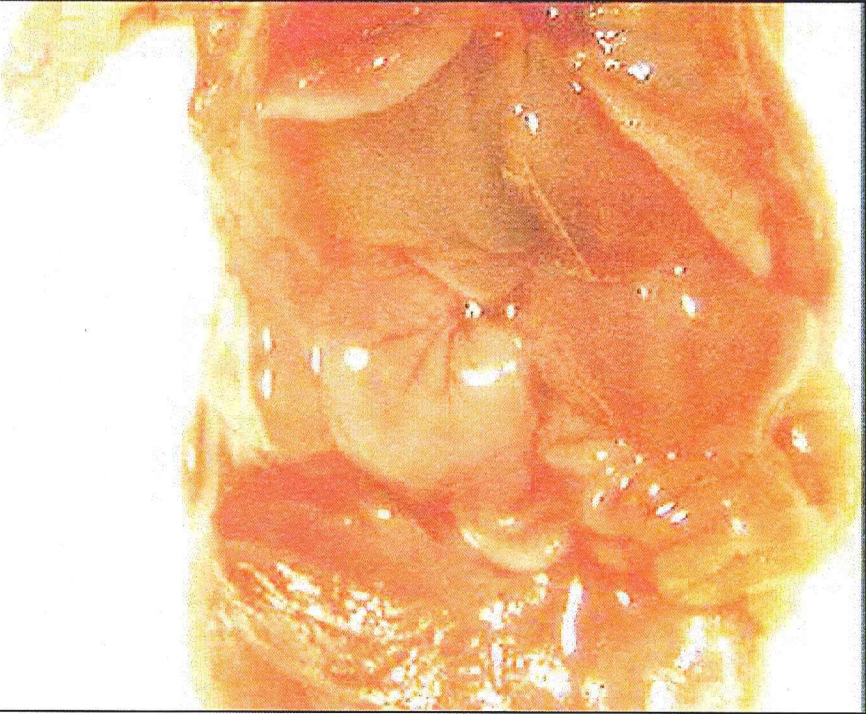
RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 1	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • <u>Cleft (secondary) palate</u> <p>What else might you see/consider?</p> <ul style="list-style-type: none"> • Possible misshapen/protruding tongue • Are there any problems with incisor sockets, lower jaw, maxillary region or eye sockets? <p>Other points</p> <ul style="list-style-type: none"> • Are cleft palates always this easy to see? <i>No</i> • What other defects are often associated with cleft palate? • Would you recommend that fetuses with such an observation were further examined skeletally or following Bouin's fluid fixation - why? 	<p><i>lip looks OK</i> <i>skinned, bloody</i> <i>transparent skin</i> <i>perhaps thin, perhaps</i> <i>musculature abnormalities</i></p> <p><i>could be cleft lip</i> <i>mouth or tooth issues</i></p> <p><i>can be in back, smaller</i> <i>abnormalities of skull bones</i> <i>eyes or brain</i></p>


RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 2	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • <u>Thoracic situs inversus</u> - but pulmonary looks unusual <p>Is there a possible alternative?</p> <p>What would confirm your diagnosis?</p> <ul style="list-style-type: none"> • Innominate artery on left side • Position of oesophagus • Orientation of heart • Lobulation of lungs <p>What else would you consider</p> <ul style="list-style-type: none"> • <u>Check abdominal viscera to see if situs inversus is complete or partial</u> <p>dextrocardia or totalis</p>	<p>transposed vessels? not a usual situs inversus - funky</p> <p>pulmonary into atrium? Atrium not shaped correctly heart malpositioned Can't see other atrium - want to move rib cage See more to be sure its a transposition or another anomalies - or maybe a mirror image</p>


RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 3	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • <u>Abdominal situs inversus</u> <p>What would confirm your diagnosis?</p> <ul style="list-style-type: none"> • Stomach, spleen and pancreas on <u>right</u> side • Position of <u>kidneys/adrenals</u> • Lobulation of liver <p>What else would you consider</p> <ul style="list-style-type: none"> • Check <u>thoracic viscera</u> to see if <u>situs inversus</u> is complete or partial • Would you comment about a right sided umbilical artery in this specimen? 	<p>Stomach, liver, intestines opposite sides but correct relationships</p> <p>In her lab would have done thoracic already but could decide totalis or not</p> <p>Check kidney position</p> <p><i>No</i> - overall call of situs inversus covers all organs</p>

RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 4	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • Eye bulge reduced in size (indicates possible micro/anophthalmia) • Shortened lower jaw • Misshapen/malpositioned pinna • Domed cranium • Pointed snout/naris <p>What else might you see/consider?</p> <ul style="list-style-type: none"> • Microstomia size of mouth • Microglossia size shape etc of tongue <p>What else would you consider</p> <ul style="list-style-type: none"> • Incisors/sockets, orbits • Would you recommend that fetuses with such an observation were further examined skeletally or following Bouin's fluid fixation – why? 	

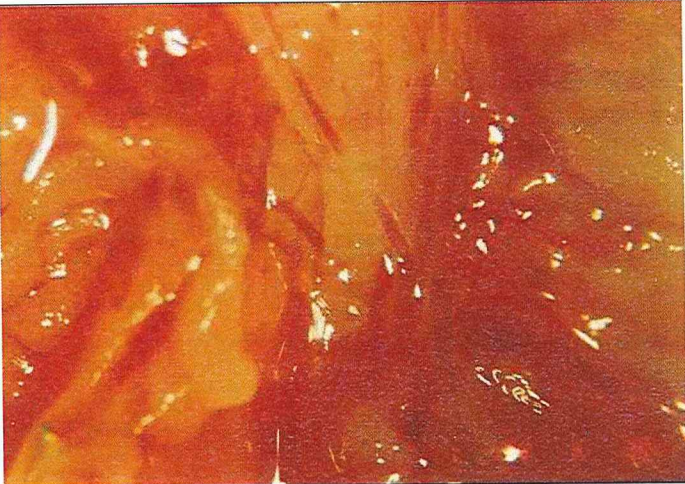
RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 5	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • Eye bulge reduced in size (indicates possible micro/anophthalmia) • Protruding tongue • Exencephaly (large amount of brain exposed, absent cranial vault) <p>What classical teratogen causes this sort of defect in rats (but not rabbits)?</p> <ul style="list-style-type: none"> • Aspirin <p>What else would you consider?</p> <ul style="list-style-type: none"> • Check palate for cleft • Would you recommend that fetuses with such an 	

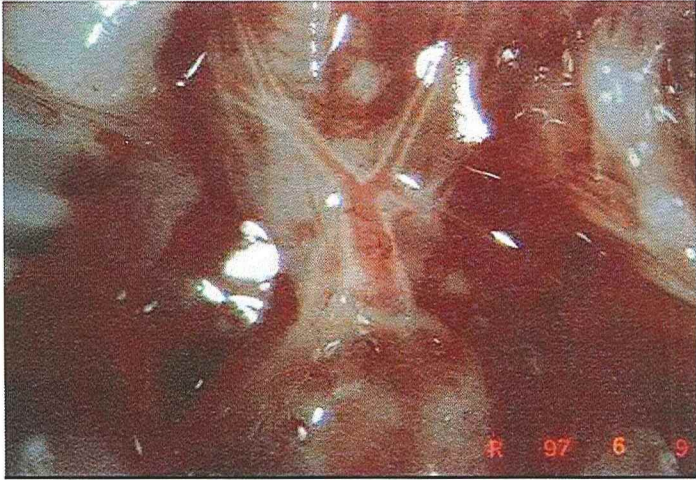
RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

	observation were further examined skeletally or following Bouin's fluid fixation - why?	
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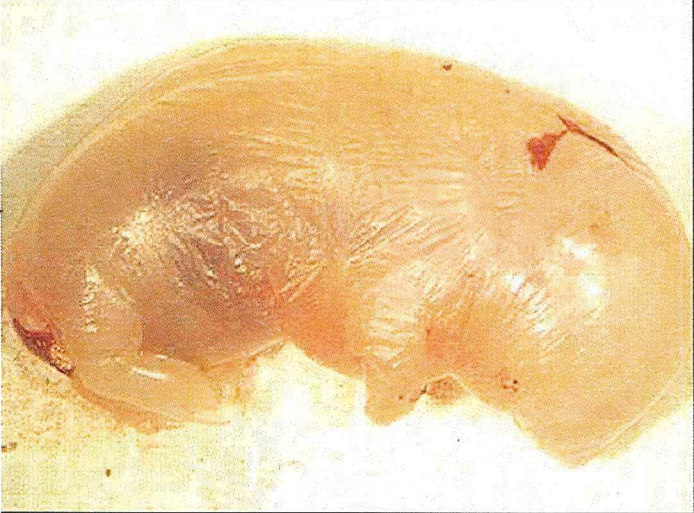
RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 6	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • Retro-oesophageal right subclavian artery <p>What else would you consider?</p> <ul style="list-style-type: none"> • Are there any other defects usually associated with this observation? • <u>Ventricular septal defect</u> 	<p>Want to move so that can determine if aortic arch retro or right subclavian. Most likely right subclavian.</p> <p>Can't see if pulmonary connects to aorta via ductus in this view</p> <p>Speculated can only see ascending aorta, can't see descending, need to move the heart.</p>
	<ul style="list-style-type: none"> • Thickening of heart • Shape of heart • Semilunar valve defects 	<p>- Can't see left subclavian need to move specimen</p>

RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 7	Questions	Answers given
 0	<p>What can you see?</p> <ul style="list-style-type: none">• Transposition of great vessels• Possible pre-ductal coarctation of transposed aorta• Dextrocardia• Difficult to see right subclavian artery/descending aorta <p>What else would you consider?</p> <ul style="list-style-type: none">• Are there any other defects usually associated with this observation?	

RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 8	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • Anasarca (oedema) • Shortened lower jaw <p>What else might you see/consider?</p> <ul style="list-style-type: none"> • Microstomia • Microglossia • Eye bulge difficult to assess because of oedema, a reduction in size may indicate possible micro/anophthalmia) • Heart/vessel defect(s) <p>What else would you consider</p> <ul style="list-style-type: none"> • Incisors/sockets, orbits • Would you recommend that fetuses with such an observation were further examined skeletally or following Bouin's fluid fixation – why? 	

RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION



What can you see?

- Blood vessel passing between left kidney and adrenal.

What might this represent?

- Incomplete inferior vena cava, drainage of lower body regions via persistent left cardinal vein.

What else might you see/consider?

- Penetration of diaphragm on left side by azygous / cardinal vein

RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION


Image c	Questions	Answers given
	<p>What can you see? Right forepaw absence of digits Ectrodactyly oligodactyly</p> <p>What else might you see/consider? How many digits evident; how many absent Are they fused? Are foot pads affected? Possible short forelimbs</p> <p>Other points Process for skeletal examination Can you tell which are missing? How might you try to work it out? Check hindlimbs Possible bent/short scapulae/long bones</p>	



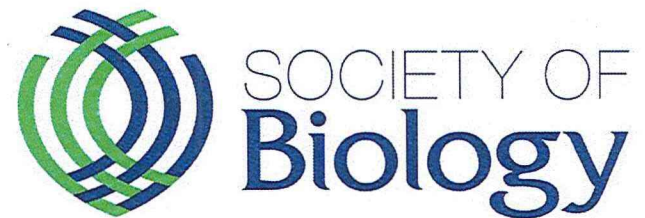
Image m	Questions	Answers given
	<p>What can you see? <u>Acrania</u> <u>*Spina bifida</u> perhaps with anencephaly <u>craniorachischisis</u></p> <p>What else might you see/consider? <u>Is spine open along whole length?</u> <u>Gastroschisis?</u> <u>Short torso?</u> <u>Open eye/absent eyelid</u> <u>Malpositioned pinnae</u> + misshapen <u>Kinked tail</u> <u>Forelimb flexures</u></p> <p>Other points Oedema neck region</p>	<p>upper + lower jaw short</p> <p>forelimbs may be short</p> <p>* Wants to see if defect connects cranial to caudal portion to determine if each stands alone</p>

Image n	Questions	Answers given
	<p>What can you see? Tail short tail threadlike</p> <p>What else might you see/consider? Entire length of tail affected</p> <p>Other points Check anal opening, could be <u>absent</u> Could be difficult to sex Process for skeletal because of termination fo vertebral column</p>	<p>– filamentous tab or tail in her lab</p> <p>May have general edema</p> <p>– wants to move tail to examine</p> <p>usually associated with absent anrs</p> <p>– genitalia may be ok</p>



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Examination type
assessed (species):

EXTERNAL AND VISCERAL RAT

Date of assessment:

November 12, 2014

Names of assessors:

Stacia Murzyn, David Schreur

Specimens used for assessment: [insert fetus ID in each box]

img 1	img 2	img 3	img 6	img M	img N
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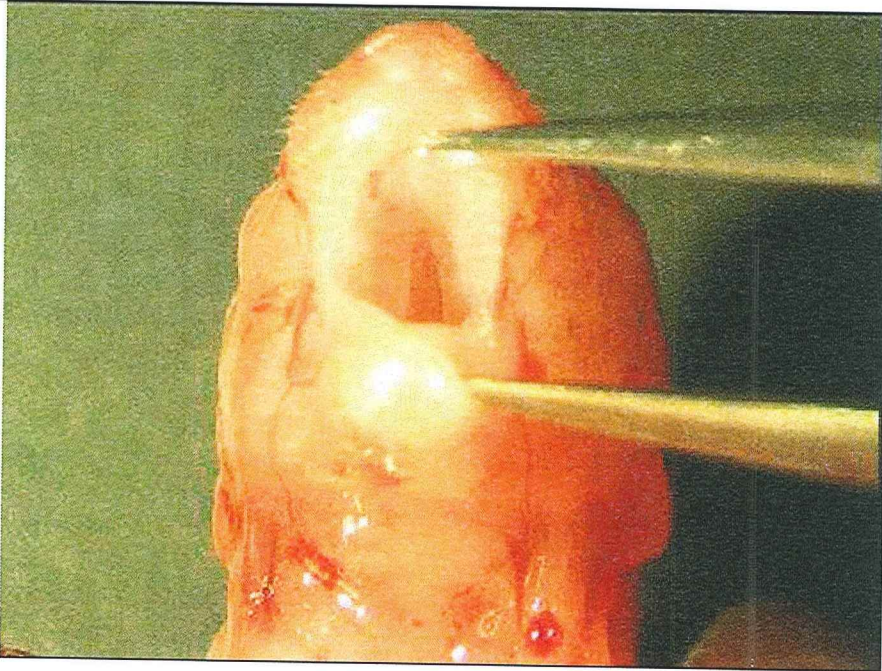
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Assessor signature

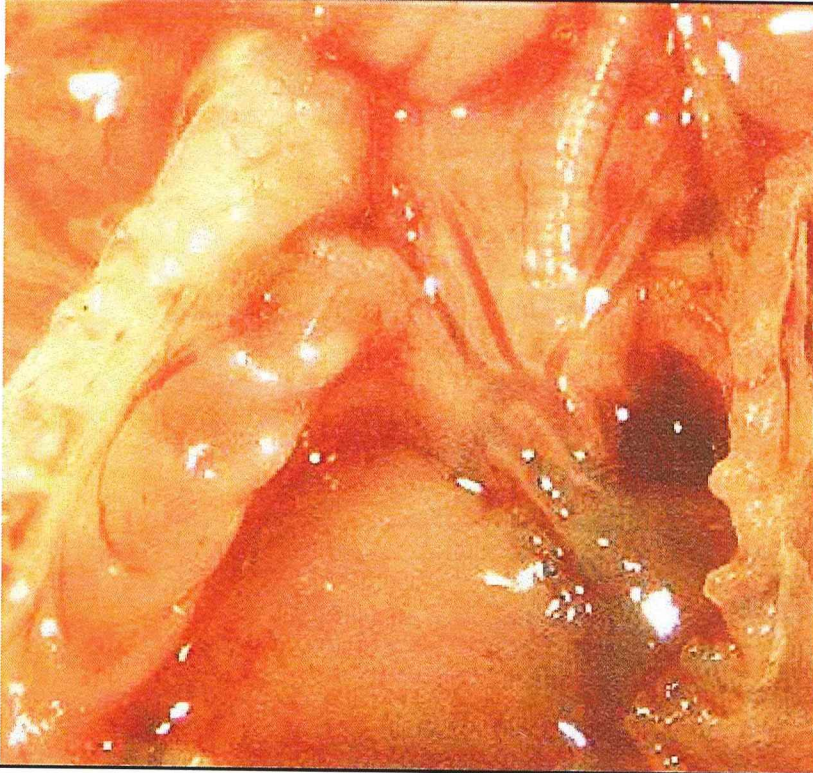
DPK

Date

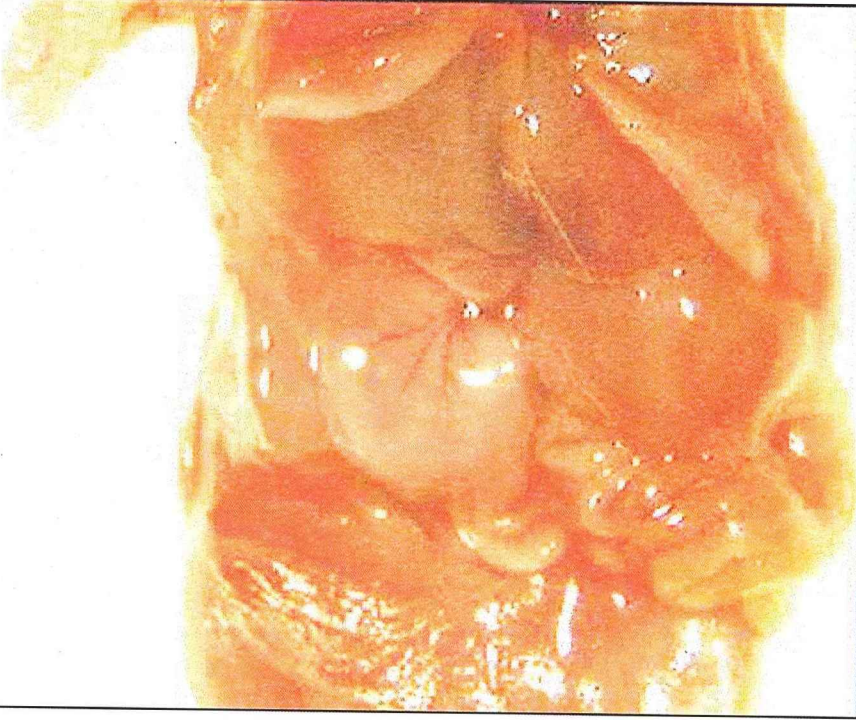
RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 1	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • Cleft (secondary) palate <p>What else might you see/consider?</p> <ul style="list-style-type: none"> • Possible misshapen/protruding tongue • Are there any problems with incisor sockets, lower jaw, maxillary region or eye sockets? <p>Other points</p> <ul style="list-style-type: none"> • Are cleft palates always this easy to see? • What other defects are often associated with cleft palate? • Would you recommend that fetuses with such an observation were further examined skeletally or following Bouin's fluid fixation - why? 	<p>CLEFT PALATE</p> <p>POSSIBLY LOOK AT EYES OR BRAIN</p> <p>SKIN LOOKS TRANSPARENT</p> <p>DON'T SEEM TO BE CLEFT LIP</p> <p>CHECK TEETH</p> <p>NOT ALWAYS SO EASY TO SEE</p>


RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 2	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • Thoracic situs inversus <p>Is there a possible alternative?</p> <p>What would confirm your diagnosis?</p> <ul style="list-style-type: none"> • Innominate artery on left side • Position of oesophagus • Orientation of heart • Lobulation of lungs <p>What else would you consider</p> <ul style="list-style-type: none"> • <u>Check abdominal viscera to see if situs inversus is complete or partial</u> 	<p>POSS BEY VESSELS ON ANTA TRANSPOSED HEART NOT TILTED RIGHT INNOMINATE SEEMS TO BE ON THE LEFT DOES NOT LOOK LIKE SITUS INVERSUS BECAUSE OF PULMONARY WORKING ABNORMAL WOULD SHARE WITH OTHER PEOPLE AND GO TO A CONFER TO CHECK AGAINST. (WHEN SAW THE NEXT PHOTO SAID WAS SAME FETUS AND SITUS INVERSUS)</p>


RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 3	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • Abdominal situs <u>inversus</u> <p>What would confirm your diagnosis?</p> <ul style="list-style-type: none"> • Stomach, spleen and <u>pancreas on right side</u> • Position of <u>kidneys/adrenals</u> • <u>Lobulation of liver</u> <p>What else would you consider</p> <ul style="list-style-type: none"> • Check thoracic viscera to see if situs inversus is complete or partial • Would you comment about a right sided umbilical artery in this specimen? 	<p>UMBILICAL ARTERY ON RIGHT WOULD BE INCLUDING IN SITUS INVERSUS</p>

RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 4	Questions	Answers given
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RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 5	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • Eye bulge reduced in size (indicates possible micro/anophthalmia) • Protruding tongue • Exencephaly (large amount of brain exposed, absent cranial vault) <p>What classical teratogen causes this sort of defect in rats (but not rabbits)?</p> <ul style="list-style-type: none"> • Aspirin <p>What else would you consider?</p> <ul style="list-style-type: none"> • Check palate for cleft • Would you recommend that fetuses with such an 	

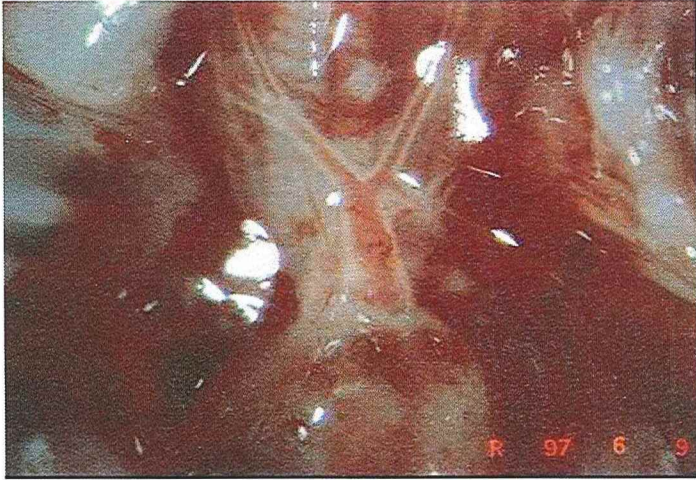
RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

	observation were further examined skeletally or following Bouin's fluid fixation – why?	
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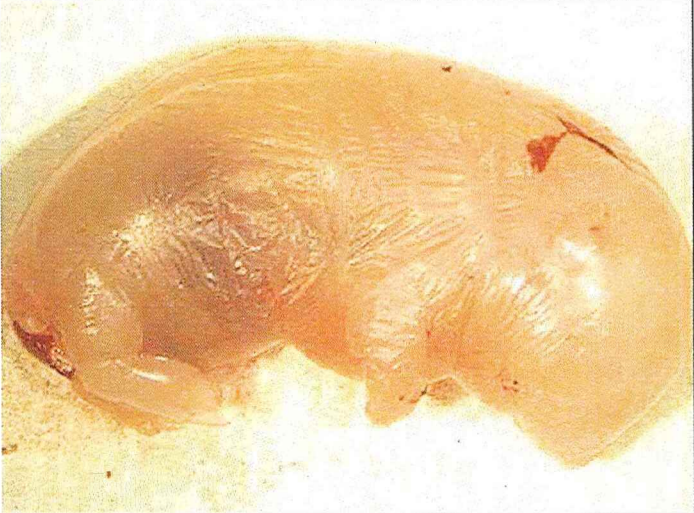
RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 6.	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none"> • <u>Retro-oesophageal right subclavian artery</u> <p>What else would you consider?</p> <ul style="list-style-type: none"> • Are there any other defects usually associated with this observation? • <u>Ventricular septal defect</u> 	<p>TRYING TO SEE IF AORTIC ARCH IS ACTUALLY PRESENT</p> <p>DOES NOT SEE ILLUMINATE</p> <p>PULMONARY MAY NOT CONNECT TO AORTA THROUGH THE DUCTUS</p> <p>IF HAD FETUS WOULD MOVE HEART TO SIDE TO SEE DESCENDING AORTA</p> <p>WOULD BE SUSPICIOUS OF THE HEART IN GENERAL</p>
		<p>WANT ME HAVE LEFT SUBCLAVIAN</p>


RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 7	Questions	Answers given
 <p>0</p>	<p>What can you see?</p> <ul style="list-style-type: none">• Transposition of great vessels• Possible pre-ductal coarctation of transposed aorta• Dextrocardia• Difficult to see right subclavian artery/descending aorta <p>What else would you consider?</p> <ul style="list-style-type: none">• Are there any other defects usually associated with this observation?	

RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

Image 8	Questions	Answers given
	<p>What can you see?</p> <ul style="list-style-type: none">• Anasarca (oedema)• Shortened lower jaw <p>What else might you see/consider?</p> <ul style="list-style-type: none">• Microstomia• Microglossia• Eye bulge difficult to assess because of oedema, a reduction in size may indicate possible micro/anophthalmia)• Heart/vessel defect(s) <p>What else would you consider</p> <ul style="list-style-type: none">• Incisors/sockets, orbits• Would you recommend that fetuses with such an observation were further examined skeletally or following Bouin's fluid fixation – why?	

RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION

	<p>What can you see?</p> <ul style="list-style-type: none">• Blood vessel passing between left kidney and adrenal. <p>What might this represent?</p> <ul style="list-style-type: none">• Incomplete inferior vena cava, drainage of lower body regions via persistent left cardinal vein. <p>What else might you see/consider?</p> <ul style="list-style-type: none">• Penetration of diaphragm on left side by azygous / cardinal vein	
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RAT FRESH EXTERNAL AND VISCERA IMAGES FOR CERTIFICATION


Image c	Questions	Answers given
	<p>What can you see? Right forepaw absence of digits Ectrodactyly oligodactyly</p> <p>What else might you see/consider? How many digits evident; how many absent Are they fused? Are foot pads affected? Possible short forelimbs</p> <p>Other points Process for skeletal examination Can you tell which are missing? How might you try to work it out? Check hindlimbs Possible bent/short scapulae/long bones</p>	


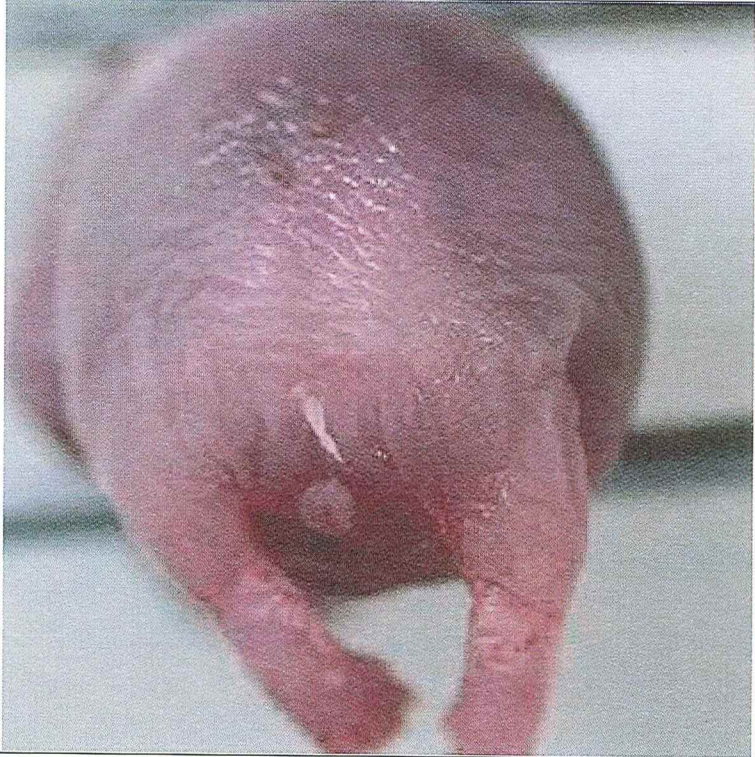
Image m	Questions	Answers given
	<p>What can you see? <u>Acrania</u> - <u>anencephaly</u> <u>Spina bifida</u> <u>craniorachischisis</u> - <u>POTENTIALLY</u></p> <p>What else might you see/consider? <u>Is spine open along whole length?</u> <u>Gastroschisis?</u> <u>Short torso?</u> <u>Open eye/absent eyelid</u> <u>Malpositioned pinnae</u> <u>Kinked tail</u> <u>Forelimb flexures</u></p> <p>Other points Oedema neck region</p>	<p><u>SHORT SNOUT</u> <u>MAY BE SHORT</u></p>

Image n	Questions	Answers given
	<p>What can you see? Tail short tail threadlike</p> <p>What else might you see/consider? Entire length of tail affected</p> <p>Other points Check anal opening, could be <u>absent</u> Could be difficult to sex Process for skeletal because of termination fo vertebral column</p>	<p>FILAMENTOUS TAIL OR A TAB</p> <p>LOOKS ACETIC ARROD, MAY BE EDEMATOUS</p>