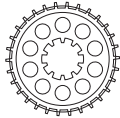


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SECTION 2 : RATS AND HUMANS

A3D Rat Anatomy LESSON 2.1

HUMAN ANATOMY FOR RATS

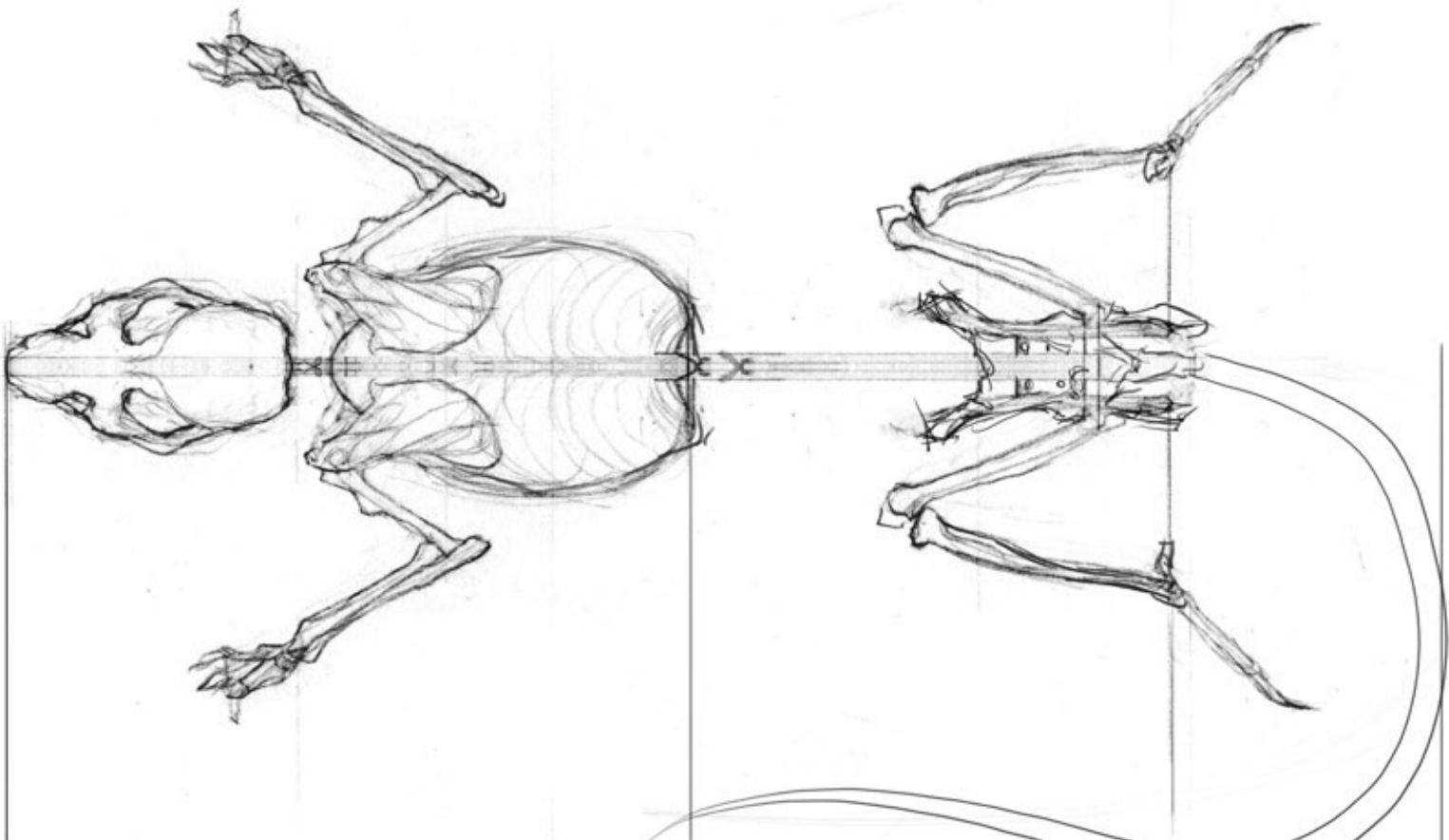
What do you need to know about human anatomy to make a rat anthropomorphic? Not a lot more than you know now. After all, you have lived in a human body all your life. But the mechanisms inside affect design, so take look at how human anatomy compares with rats.

THE SKELETON

Rats are not made to stand up like humans. But when they do, you see that they have the same basic parts, plus a tail. Actually, humans have a tail, but it curves under to hold things in. Rats, like many four-legged animals, do not have such worries, so their spines, rather than curving in, extend out. A tail is a continuation of a spine.

Human legs line up to be naturally straight because humans are standing creatures. Rats' hind legs are naturally bent, like levers ready to spring.

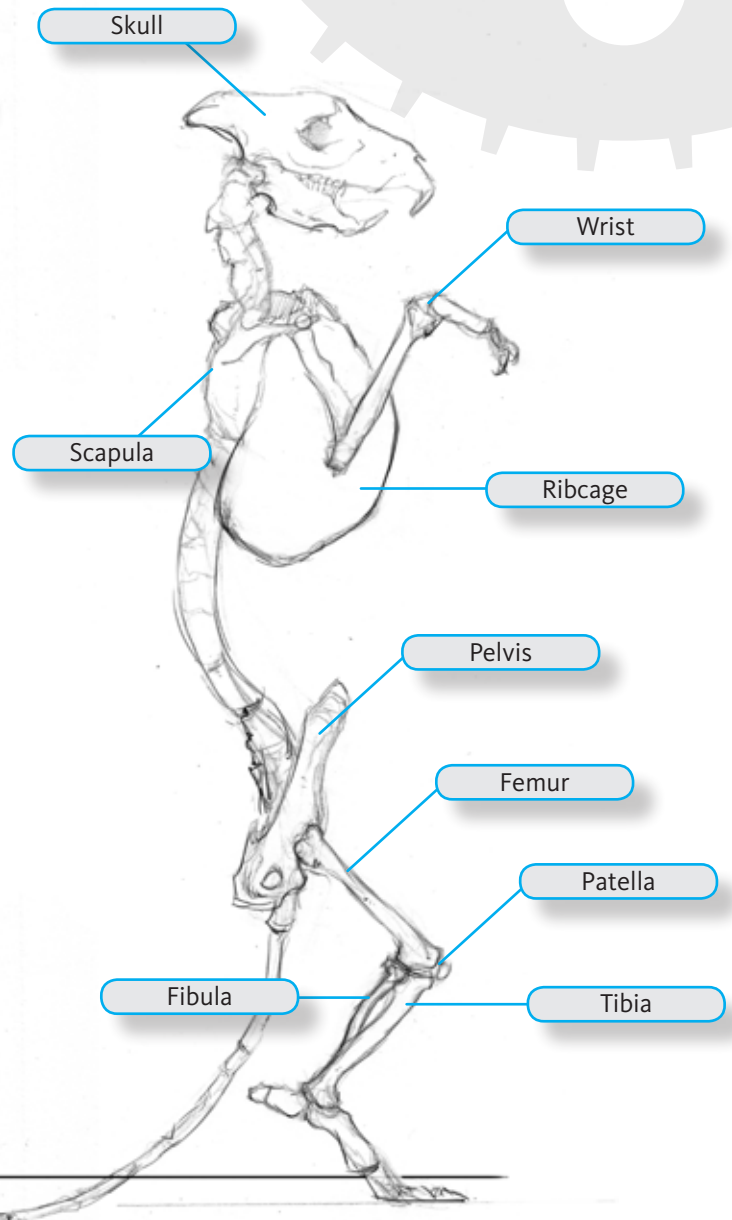
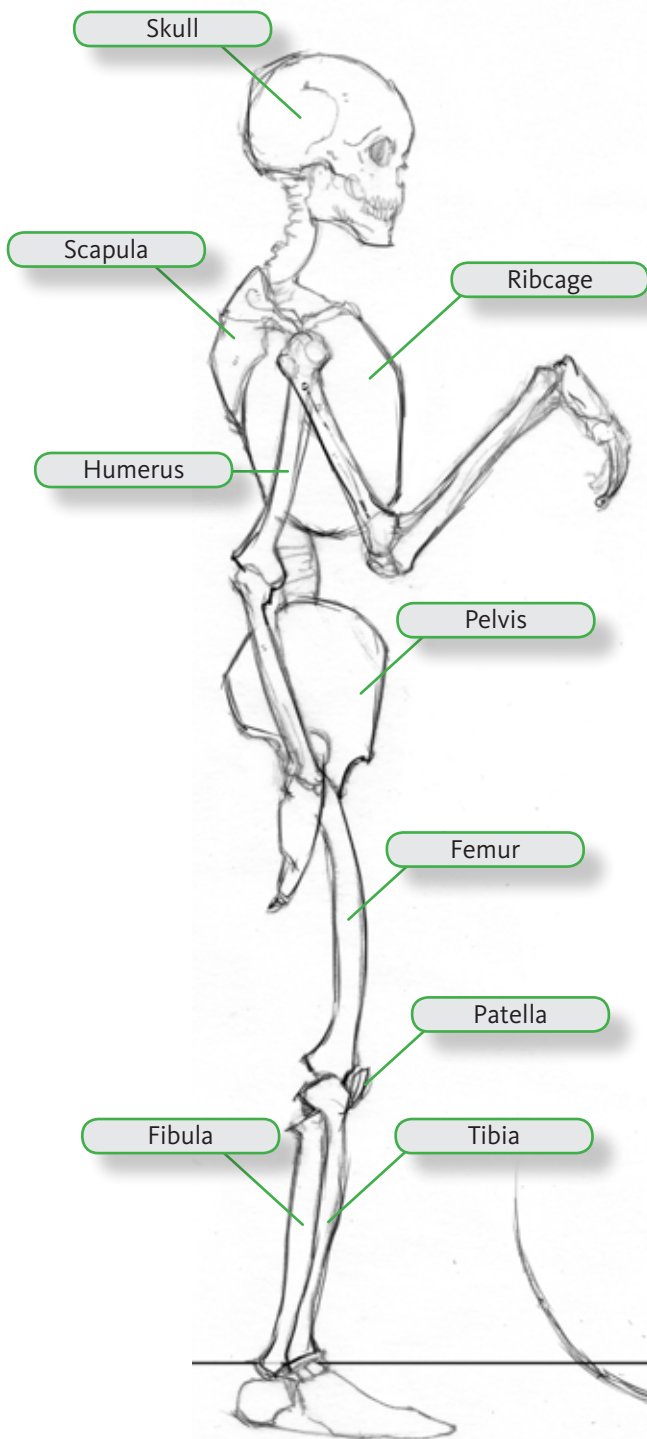
And most importantly of all, humans plant their feet on the ground. Humans are plantigrades. Rats stand on their toes, which are technically called digits. Rats are digitigrades.



LEVEL 2 HUMAN ANATOMY FOR RATS Conceptual

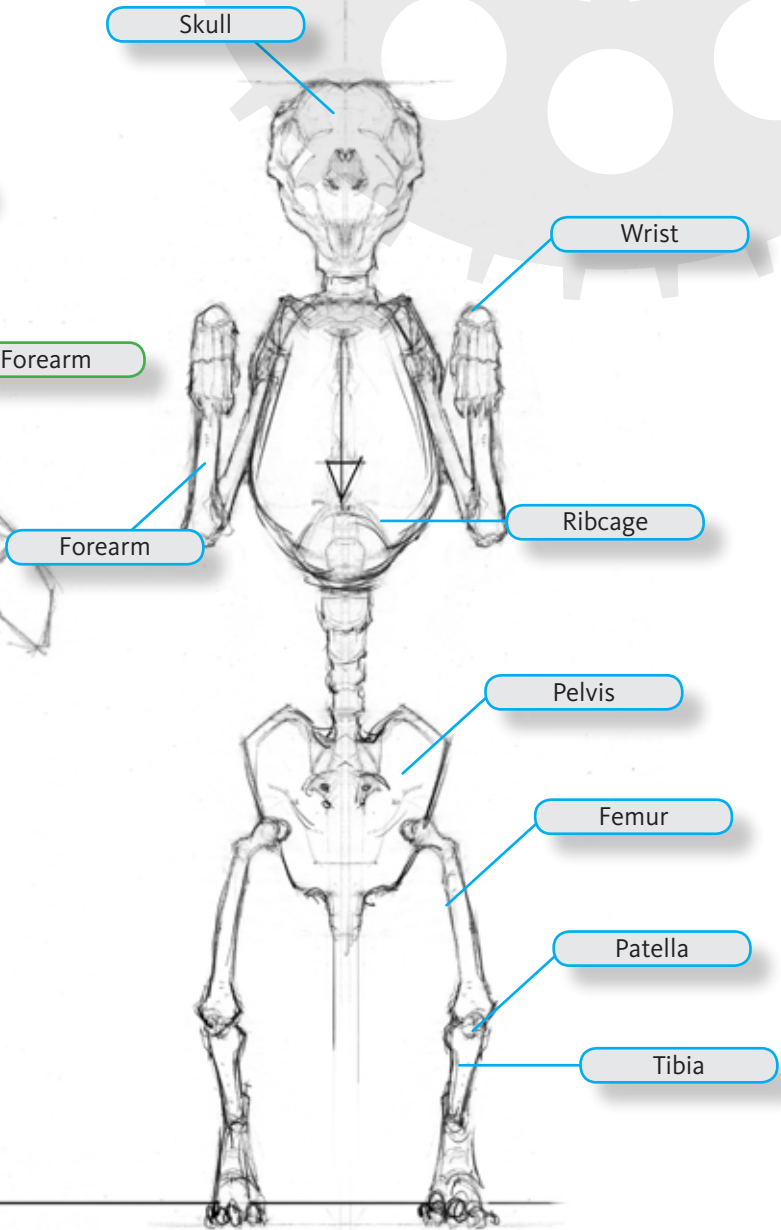
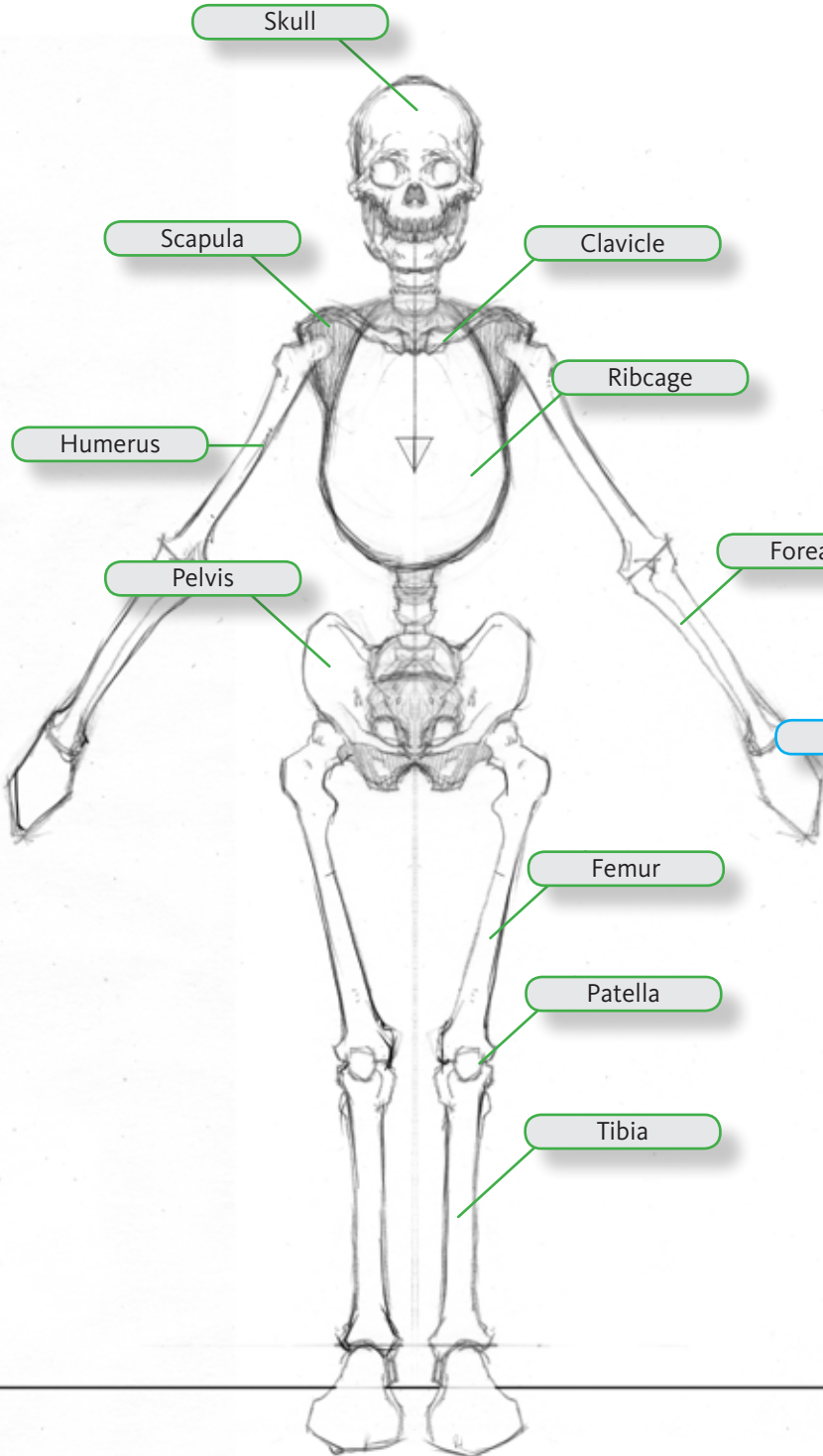
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Compare the bone names. They are pretty much the same. The difference is in the proportions.



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LEVEL 2
HUMAN ANATOMY FOR RATS
Conceptual

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A3D Rat Anatomy LESSON 2.2

MUSCLES

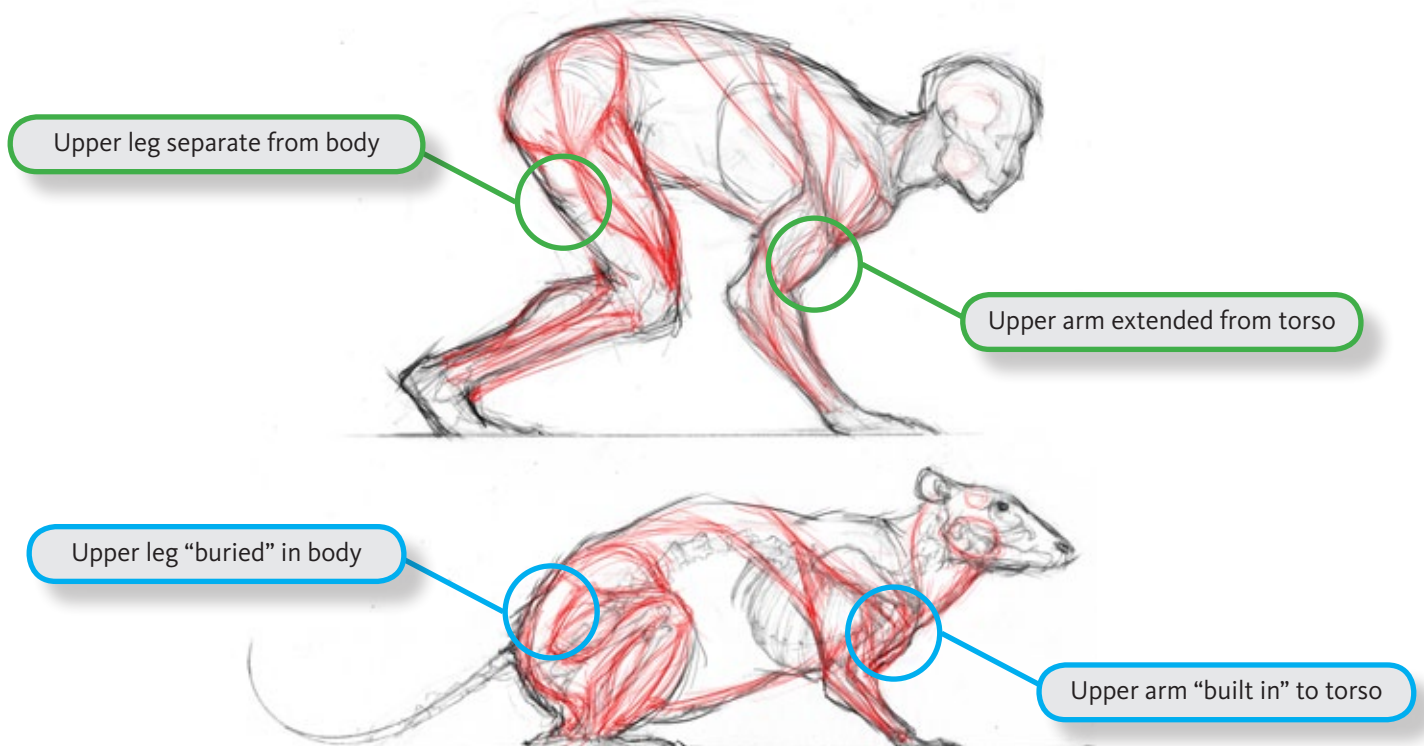
Like rats, human muscles only pull. They come in pairs that complement each other. And they are bulkier near the trunk, thinner near the extremities.

Compare the legs and you see that the human upper leg emerges from the body. The upper leg of a rat is buried in the body mass; its knee is up near its side, connected with a flap of skin. That means the hind end of a rat is mostly upper leg. This is the case with all four-legged animals. Their upper leg muscles meld into their torsos.

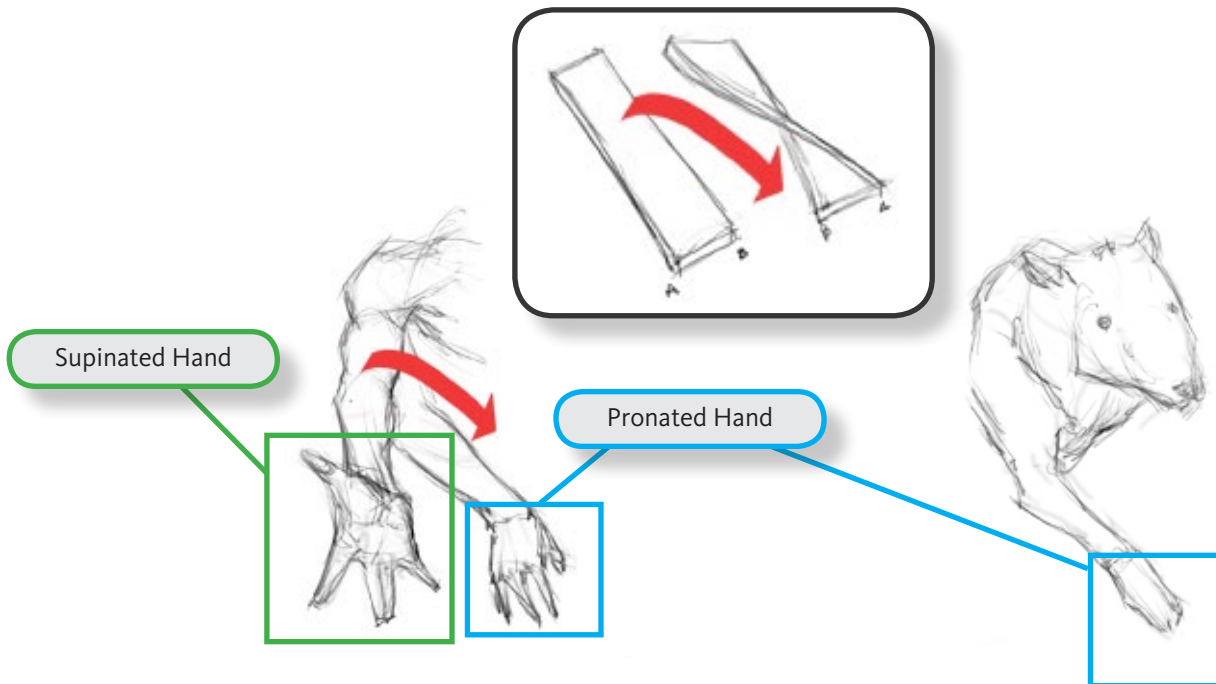
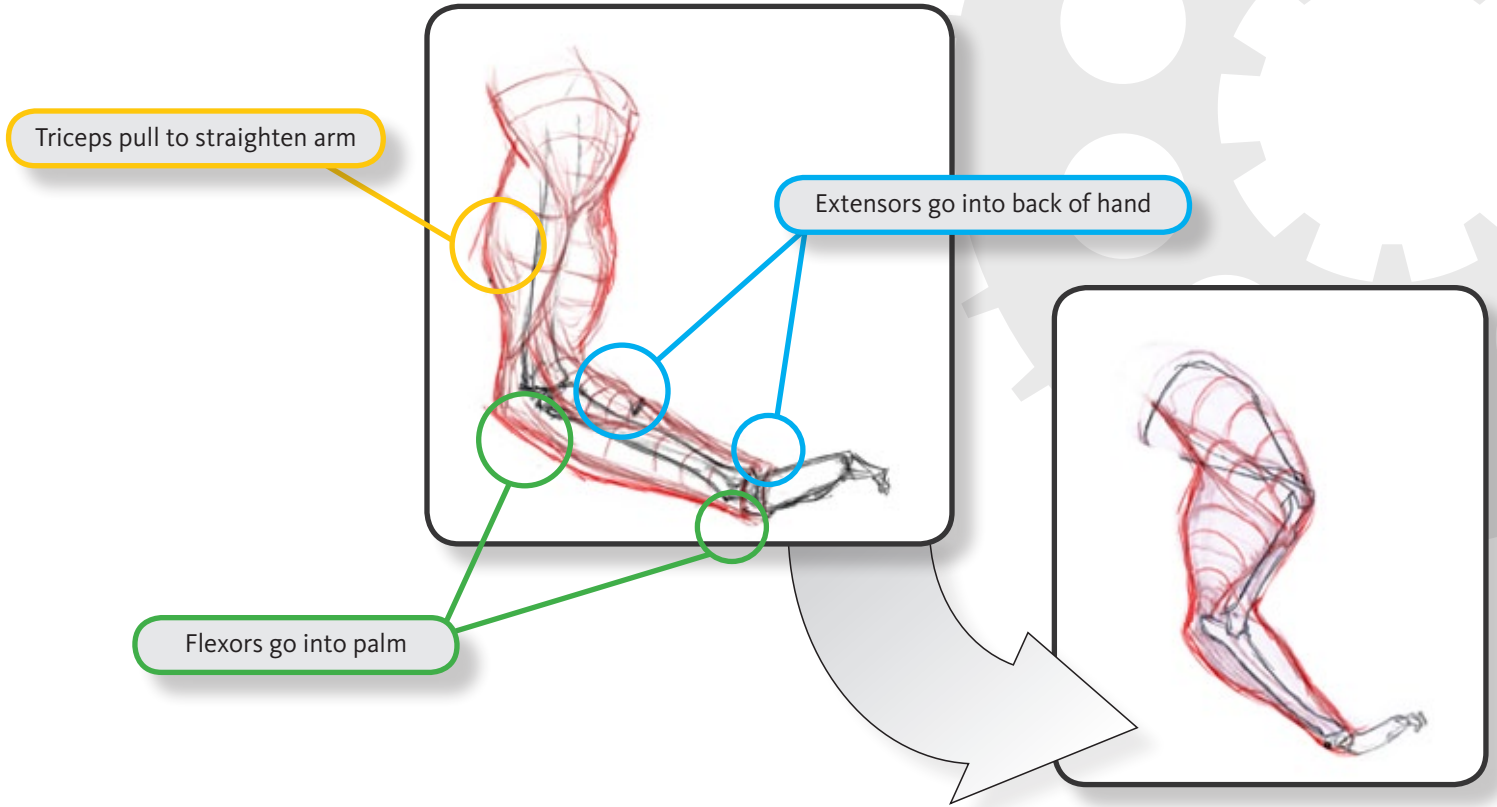
Compare the arms and you see the similarities, but with difference. One difference is that the human upper arm is long and emerges from the body. The upper arm of a rat is short and, like its upper leg, is mostly buried in the side of its shoulder.

One other thing: humans have thumbs. Humans can grip things with a spread hand, and rotate their forearms. Human bones and muscles enable them to build complex objects. When humans spin their palms up, it is called supination. When humans spin their palms down, it is called pronation. Rat paws are mostly prone. They can spin a little, and almost look as if they have hands with thumbs.

This is where you will get creative. In the coming lessons, you will see that a rat with hands does not look that strange—not as strange as a horse with hands. But as soon as those rat hands can spread enough to grip a screwdriver and turn it, you have an anthropomorphic rat.



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A3D Rat Anatomy LESSON 2.3

WHAT HAPPENS WHEN A RAT BECOMES A BIPED?

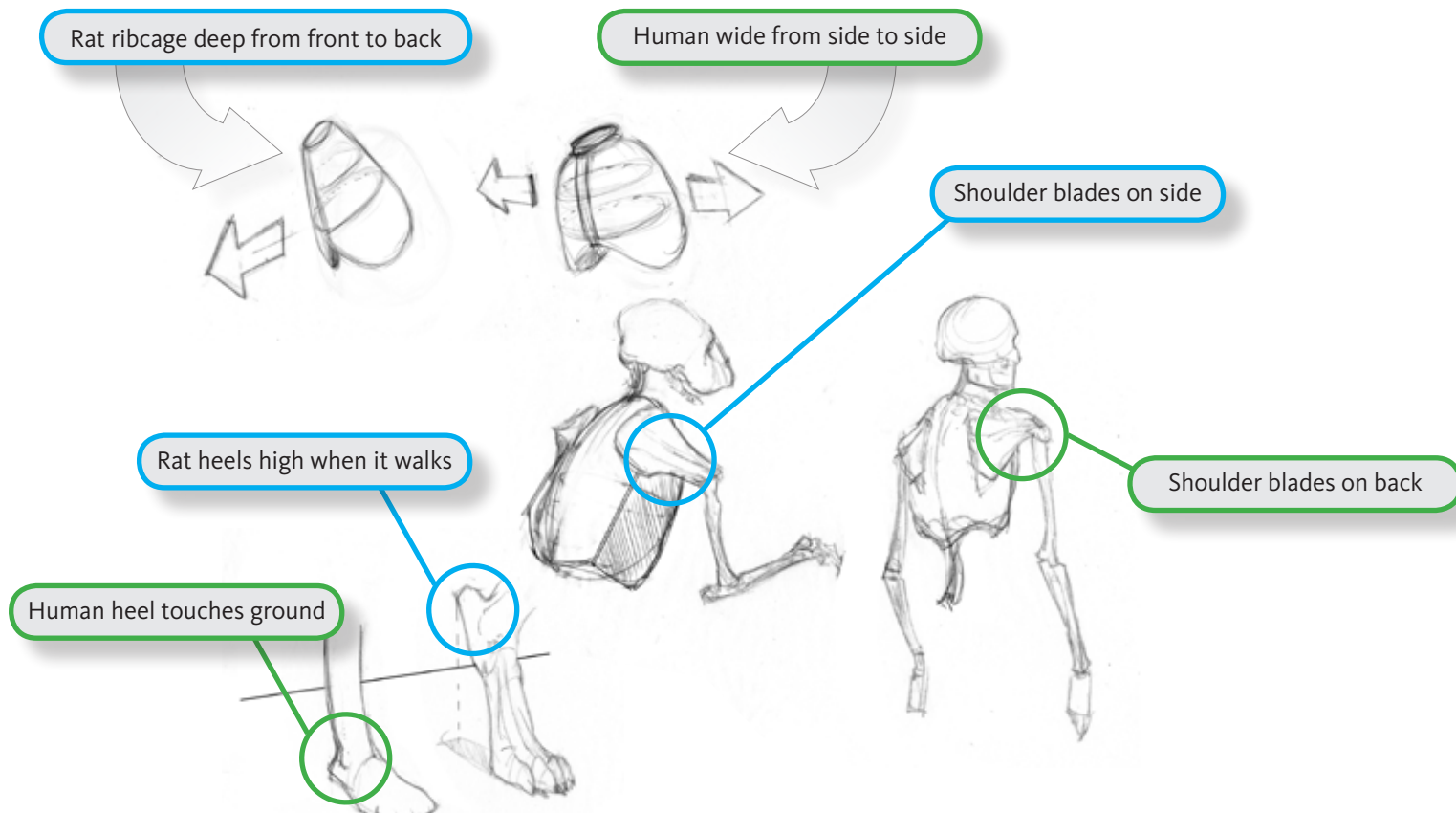
If a rat stood up as often as a human does, it would need anatomy fit for it.

It would need a ribcage that is not so deep from front-to-back. When your dog stands to beg, notice that its ribcage sticks out in front awkwardly. This is typical of animals that walk on four legs, and it makes it awkward for them to stand without falling forward. Humans have ribcages that are shallow from front-to-back, wide from side-to-side.

Humans also have shoulder blades on wide backs. Rats have narrow backs with no room for shoulder blades, so they have shoulder blades on their sides so they run around on their arms as if they were legs.

And the whole point about bipeds is that they stand on two feet instead of four. When humans stand, their heels stay planted on the ground. When a rat stands, its heels rise off the ground.

This is the way it would really happen. But since you are about to get creative, you will break some rules in the next section when you exaggerate this rat into a worthy character.



LEVEL 2

HUMAN ANATOMY FOR RATS

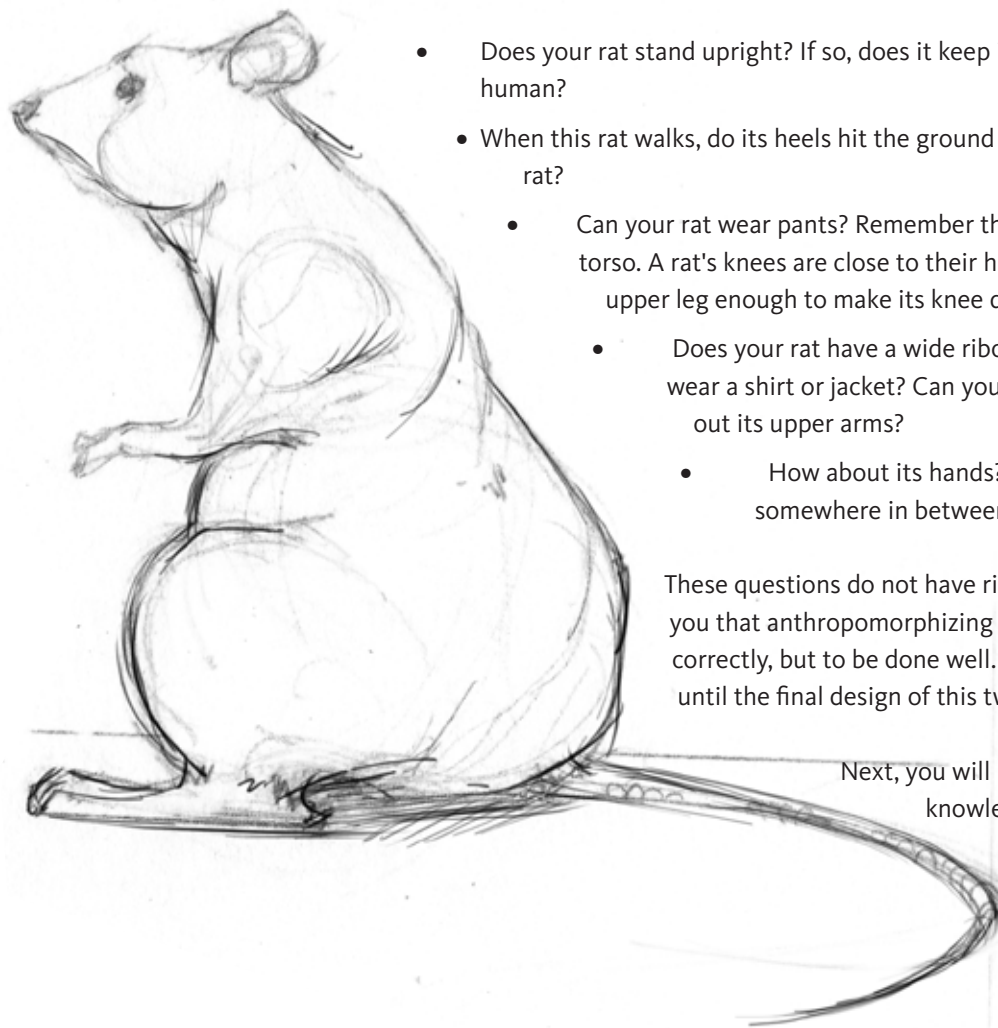
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A3D Rat Anatomy LESSON 2.4

QUESTIONS AND REMINDERS

You have been studying how human and rat anatomy compare so that you can design a rat that looks human, not like a giant rat with clothes. Here are some questions and reminders.



- Does your rat stand upright? If so, does it keep its feet planted on the ground like a human?
- When this rat walks, do its heels hit the ground like a human, or does it tiptoe like a real rat?
- Can your rat wear pants? Remember that human knees are distant from the torso. A rat's knees are close to their hindquarters. Can you extend this rat's upper leg enough to make its knee distinct?
- Does your rat have a wide ribcage and shoulders that enable it to wear a shirt or jacket? Can you make it look more human by stretching out its upper arms?
- How about its hands? Are they paws, or hands, or somewhere in between?

These questions do not have right or wrong answers. They remind you that anthropomorphizing a rat is a creative task, not to be done correctly, but to be done well. You choose, then assess, then revise until the final design of this two-legged rodent becomes convincing.

Next, you will look at how to exaggerate this knowledge so that your rat will not look accurate, but interesting. Not a creature, but a character.