

Preview Material Exam 4 Spring 2005

The animals that we use as a source for meat differ in their efficiency to convert plant foods such as grains to meat. The following table shows the approximate amount of grain required to produce one pound of meat.

Species	Amount of grain (pounds)
cows	17
pigs	10
chickens	4

Breeding, male North American sunfish (e.g. bluegills or pygmy sunfish) are often brightly colored. However, in largemouth bass (another species in the same family), males and females look identical and, unlike other nest-tending sunfish, they provide bi-parental care to the eggs and fry (young). Recently, scientists used paternity testing to determine whether the eggs in each largemouth bass nest were all full-siblings (same parents) or half-siblings (share only one parent).

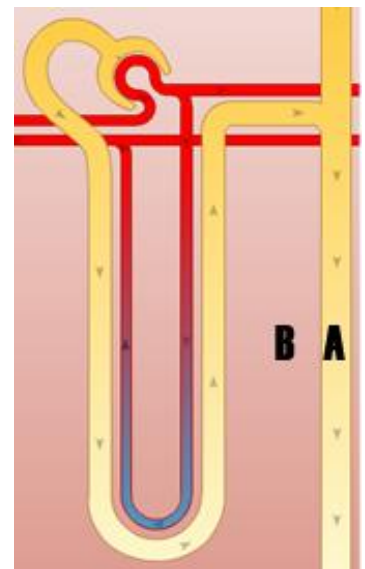
The Siberian Hamster is a rodent that is both a popular pet and research animal. They produce and respond to Leptin like mice. Unlike laboratory mice, these animals live in very cold and dry climates and hibernate in winter. Animals prepare to hibernate as day-time hours decrease. A mutant hamster was found that weighed three times what normal hamsters weigh. The scientists named the mutant "sumo". When any sumo is crossed with a normal hamster, all of their offspring were normal. When injected with Leptin, the sumo mutants are affected as follows:

	Sumo Hamster + water (placebo)	Sumo Hamster + Leptin
Weight	300g	125g

In another study using normal hamsters, scientists altered the number of hours of daylight and measured the Leptin produced by the hamsters. The results were:

Characteristic	Group A	Group B
Photoperiod (hours with lights on:off)	16:8	8:16
Average Weight	117g	100g
Leptin Level (ng/ml)	20	8

The length of the nephron loops lets the hamster's kidney concentrate the solution (ions) in the area surrounding the collecting ducts (B). The ion concentration outside of the nephron loop in the area above B in the figure is greater than that in the loop itself, yet the nephron loop continues to add ions (Na^+ , Cl^-) to that area.



Budgerigars ("budgies") are small parakeets that occur in flocks in the Australian Outback but are also popular as pets. Wild budgerigars are green and yellow; bird breeders also raise budgies with a mutant plumage that is primarily sky blue in color.

Large numbers of people in San Diego rush to hospital emergency rooms complaining of gastrointestinal flu-like symptoms that have persisted for several days. Infants, the elderly, and the immunosuppressed are more severely affected. Public health researchers gather information to determine the source of this illness: *Cryptosporidium parva*. *Cryptosporidium* is an intestinal protozoan parasite of mammals that is transmitted through fecal contamination. Because there is no effective drug to eliminate the parasite, patients are treated for their symptoms and some of the most severely affected die. Most of the people with the parasite are from a district of the city that draws its water from the same source: an older, secondary water treatment plant located downstream from a feedlot that stores livestock wastes in a lagoon near the river. The researchers test for coliforms (intestinal bacteria), at several locations along the river from the feedlot to the water treatment plant, and find the highest concentrations at the sites adjacent to the feedlot. The water down the river from the water treatment plant is very turbid (cloudy), especially after several bright sunny days

The Greater Honeyguide is an unusual African bird that feeds almost exclusively on the eggs, larvae, honey, and wax of beehives. Symbiotic bacteria in the guts of honeyguides allow them to obtain nutrition from beeswax, and the birds can subsist for long periods eating nothing but wax. Honeyguides usually cannot break into beehives on their own, and have evolved display behaviors that lead larger animals to beehives. For thousands of years, humans in search of honey have been the mammals that break into hives they are led to by the honeyguides, but the original target of the honeyguides was likely the "honey badger," a medium-sized carnivore that eats almost anything, but especially loves bee larvae. When a honey badger rips into a hive with its strong claws (or a human does likewise with a knife), it endures a few stings for a quick meal of larvae and honey. The honeyguide then feasts on bee larvae and beeswax, neither of which it could access by itself because it is unable to break into the hive on its own. As another wrinkle in this story, honeyguides are brood parasites - they lay their eggs in the nests of other birds.

The woodmouse (*Apodemus sylvaticus*) and yellow-necked fieldmouse (*Apodemus flavicollis*) are distinct species found together in many areas of Europe. They are very difficult to tell apart based on appearance.