

# Bihar Animal Sciences University, Patna

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**Course No;. ANN-607**

**Topic: Feeding of Lab Animals**

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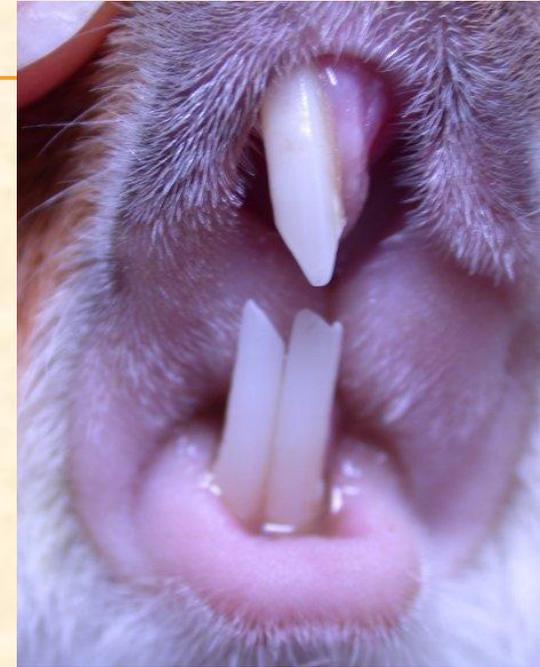
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# Lab animals

- ✘ Used in **biomedical research**
- ✘ **Rat and mice** are most common
- ✘ Apart from these **guinea pig, hamster, chinchilla, gerbil, vole** etc
- ✘ Serve as model for advancement of human and animal health.
- ✘ **G. Pig → a valuable model for several human diseases.**
- ✘ Plays imp model for hearing research, toxicological, allergy diseases, non infectious pulmonary disease reproductive, osteoarthritis and atherosclerosis studies
- ✘ A well balanced diet is imp for lab animals because
  - 1) Animal welfare**
  - 2) Unbiased experimental results from nutritional factors**
- ✘ Nutritional factors influence general well being, health production, performance and ability to pathogens and environmental stress

# Domestic Guinea pig

- ✘ *Cavia porcellus*
- ✘ probably originated in Peru, Argentina or Brazil
- ✘ Herbivorous- consumes large quantities of vegetation
- ✘ Molar teeth specially suited for grinding
- ✘ Like other rodents sp. Possess open rooted incisors that continuously grow throughout their life



# Domestic Guinea pig

- ✗ Like rat, mouse and rabbit, are **simple stomach animals**
- ✗ In contrast, **entire stomach lined with glandular epithelium**
- ✗ Intestine **allows growth of Gm+ve bacteria** → help host to meet nutritional req. Through direct absorption of bacterial metabolites and other materials through coprophagy
- ✗ **Has large semicircular caecum with numerous lateral pouches** (resembling that of rabbit)
- ✗ → microbial fermentation (**synthesis of B complexes and EAA**) for **recycling of nutrients by coprophagy**.
- ✗ Peculiarity of Vitamin C:
- ✗ Cannot synthesise ascorbic acid (dietary essential)

# Domestic Guinea pig

- × Male : female 1: 5
- × Av litter size: 3.5 (1-8)
- × Birth Wt: 85-100 g
- × Weaning age: 12-14 d (170 g)
- × Breeding age: 2.5-3 month
- × Gestation: 68 day (66-72 days)
- × No of litter/yr: 3
- × Adult BW: 500 g
- × Adult diet: 7-8% BW

## Feed intake:

- × growing=20-30 g
- × adult=30-50 g
- × Pregnancy and lactation=40-60 g
- × DMI reduces during summers
- × Kept in hutches during pregnancy and parturition

# Domestic Guinea pig

- ✘ Av litter size: 4-8
- ✘ Birth Wt: 4-5 g, may <4g if liiter size 10-12
- ✘ Eyes opened at: 14-16 days
- ✘ Weaning age: 12-14 d (35 g)
- ✘ Age at 1<sup>st</sup> litter: 93-111 days
- ✘ Gestation: 21 days
- ✘ Life span: 2.5-3 yrs
- ✘ Adult (1 yr) BW: 203 g (male)      193 g (female)
- ✘ Adult diet: 7-8% BW

## Feed intake:

- ✘ growing=15 g
- ✘ adult=15 g
- ✘ Pregnancy = 15-20 g
- ✘ lactation=30-40 g
- ✘ Maintenance energy req=114kcal ME/BW

## Requirement for Comp. feed for G pig (BIS)

Nutrients	Req. (%)
Moisture	10, max
CP	22, min
EE	4, min
CF	9-14
TA	9
AIA	1, max
Ca	1.2, min
P	0.6, min
Vit C	200 mg/kg, min



# Feeding of Guinea pig

- × Consumes **many small meals throughout day**
- × Is fastidious/fussy in food choice
- × **Resist abrupt changes** in composition and form of diet
- × Animals reared on pelleted diet generally do not accept powdered purified diets unless gradually introduced
- × Newborn can consume semisolid to solid food  
although weaning occurs after 3 weeks
- × Grows **@5-7g/day during rapid growth period (ad lib feeding)**
- × Growth slows after 2 months (8 wk) and maturity achieved at 5 months
- × However wt. Gain may continue upto 12-15 months to attain BW of **700-850 (females) and 950-1200 g (males)**
- × Best known for **Vit C req. → suitable to study collagen biosynthesis, wound healing (exclusive roles of vit c)**
- × FOS supplementation stimulates caecal microbial proliferation thereby improving N retention.

TABLE 4-1 Estimated Nutrient Requirements for Growth for Guinea Pigs

Nutrient	Unit	Amount, per kg diet	Comments
Protein	g	180.0 <sup>a</sup>	
(28.6 g N × 6.25)			
Essential fatty acids (n-6)	g	1.33–4.0	10 g corn oil/kg diet is satisfactory
Fiber	g	150.0	Used cellulose and/or materials of low digestibility to supply bulk
Amino acids <sup>b</sup>			
Arginine	g	12.0	
Histidine	g	3.6	
Isoleucine	g	6.0	
Leucine	g	10.8	
Lysine	g	8.4	
Methionine	g	6.0 <sup>c</sup>	
Phenylalanine	g	10.8 <sup>d</sup>	
Threonine	g	6.0	
Tryptophan	g	1.8	
Valine	g	8.4	
Dispensable nitrogen	g	16.9 <sup>e</sup>	
Minerals			
Calcium	g	8.0	Requirements for calcium, phosphorus, magnesium and potassium seem to reflect interactions among them
Phosphorus	g	4.0	
Magnesium	g	1.0	
Potassium	g	5.0	
Chloride	g	0.5	From the estimate for rats fed purified diets
Sodium	g	0.5	
Copper <sup>f</sup>	mg	6.0	
Iron	mg	50.0	Estimate
Manganese	mg	40.0	
Zinc	mg	20.0	
Iodine <sup>g</sup>	µg	150.0	Based on rat requirement
Molybdenum	µg	150.0	Based on rat requirement
Selenium	µg	150.0	Based on rat requirement diets

TABLE 4-1 Estimated Nutrient Requirements for Growth for Guinea Pigs

Nutrient	Unit	Amount, per kg diet	Comments
Vitamins			
A (retinol) <sup>h</sup> or ( $\beta$ -carotene)	mg	6.6	Used 40% as efficiently as preformed vitamin A
	mg	28.0	
D (cholecalciferol) <sup>i</sup>	mg	0.025	Adequate; no quantitative data
E ( <i>RRR</i> - $\alpha$ -tocopherol) <sup>j</sup>	mg	26.7	Adequate
K (phylloquinone)	mg	5.0	Adequate; dietary deficiency has not been produced
Ascorbic acid	mg	200.0	
Biotin ( <i>d</i> -biotin)	mg	0.2	Adequate; simple dietary deficiency has been produced
Choline (choline bitartrate)	mg	1,800	
Folic acid	mg	3.0-6.0	
Niacin	mg	10.0	
Pantothenic acid (Ca- <i>d</i> -pantothenate)	mg	20.0	
Pyridoxine	mg	2.0-3.0	
Riboflavin	mg	3.0	Estimated
Thiamin (thiamin-HCl)	mg	2.0	

## Example of a Natural-Ingredient Diet Used for Guinea Pig Breeding Colonies

Ingredient	Amount, g/kg
Alfalfa meal (17% protein)	350.0
Soybean meal (49% protein)	120.0
Ground whole oats	252.5
Ground whole wheat	236.0
Soybean oil	15.0
Dicalcium phosphate	5.0
Calcium carbonate	10.0
Salt	7.5
Mineral and vitamin premixes <sup>a, b</sup>	4.0