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# "Calcium metastasis in tepezcuintle (Cuniculus paca) provoked by hypervitaminosis D, as a result of envelope solar exposure"

Volume 9 Issue 1 - 2025

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**Received:** December 31, 2024 | **Published:** January 27, 2025

**Keywords:** hypervitaminosis D, feeding, vitamin D3, dry basis, dog, stomach, kidney, lung, muscle, aorta, diaphragm, bladder urinary tract, spleen and ribs

## Introduction

The order Rodents contains 29 families, 468 genera and 2052 species; the habitats busy by these are numerous and varied which include: subterranean, terrestrial, arboreal and semi aquatic. Many rodents are of habits nocturnals like the tepezcuintle (*Cuniculus paca*) and pigtail *(Coendu mexicanus)* and some others are dinners like the cotuza (Dasyprocta punctata).[1,2,3] Cases of hypervitaminosis D and calcium metastases in various rodents such as groundhogs, beavers and others has been reported associated with a feeding based on concentrated for primate, providing by end high levels of vitamin D3.

## Report of the case in point

The tepezcuintles (*Cuniculus paca)* of a collection captive, were sheltered in and enclosure enclosed with mesh and provided with a roof covering a third of this, counting to its time with quite solar exposure. The specimens were fed with a diet based in concentrated for dog, fruits, vegetables and supplement vitamin /mineral. The shoe satisfaction the requirements and the percentages of inclusion recommended for rodents maintained in captivity, which contributed 0.48% calcium and 0.45% phosphorus on dry basis, loss vitamin D3 levels were not tabulated however the dog concentrate reported 4000 IU/kg.

From the start of 2003 were recorded the first deaths being pneumonia the leading cause of deaths. In the findings macroscopic of the necropsies was observed calcification of tissues soft: stomach, kidney, lung, muscle, aorta, diaphragm, bladder urinary tract, spleen and ribs.

In the 2005 the collection received a donation of five tepezcuintles (*Cuniculus paca*) which they had been maintained in a terrace, so feeding was fruit and vegetable based. The specimens were evaluated clinically, taking samples blood tests and x-rays; these latest ones revealed calcification of the aorta and ribs. In the course of that year they died three specimens by diverse causes, finding en all of them the individuals calcification at the level of aorta, rib, stomach and lung. Initially calcium metastasis was considered to be due to excess calcium in the diet and/or hypervitaminosis D, deciding eliminate the dog concentrate to reduce the calcium and vitamin D3 levels, however the following deaths they continued reporting calcification lesions of tissues soft (2005 animals) so the diet was discarded as the main cause.

## Discussion

The tepezcuintles (*Cuniculus paca*) inhabit in areas of forest tropical areas near springs of water, from of the lands lows from southern Mexico to Brazil.[1,4–6] These forests tropical areas in those inhabiting the tepezcuintle are characterized for the cups of his trees touch and intertwine with each other, forming a vegetable vault that allows barely the passage of light. The structure forestry is different from others types of forest by so amount of layers vegetables, to which they are known as strata. The stratum more underground is the mountain under, composed of palms, plants herbaceous, pimples and stubs. Only about 2% of sunlight reaches this far stratum, so that the species inhabiting it has developed adaptations special low light survival.[7,8]

The tepezcuintles (*Cuniculus paca*) rodents nocturnals, spend most of the day in burrows, emerging several hours after dusk in search for food looking for mainly fruits, leaves and seeds.[1-4,8-10] The rodents in captivity are maintained with diets contributing 25% protein raw, 7.5% fat, 2.25% fiber crude, 0.8% calcium and 0.7% phosphorus on dry basis, using as model nutritional the requirements for NRC laboratory rodents.[9,11,12]

The vitamin D is intimately related to in the homeostatic control of the calcium and phosphorus levels in circulation and in absorption of the calcium dietetic. There are two forms of vitamin D, the ergocalciferol (D2) which is found in small ones quantities in plants and cholecalciferol (D3). For the production of the cholecalciferol toma place in the epidermis during irradiation exposureultraviolet converting 7-dehydrocholesterol to cholecalciferol. The hydroxylation occurs in the liver and final conversion occurs in the kidneys. The kidneys they excrete excess calciumserum, but so the calcium and phosphorus levelsserums are heightened the capacity of the kidneys can to be exceeded, leading to calcification metastatic.[12,13]

The animal's nocturnals and the species that live underground earth may not require the vitamin do well obtain it from his food.[10] The

levels excessive vitamin D to level dietary and parenteral tend to raise the level serum of 25 - hydroxycalciferol promoting increment of calcium and phosphorus absorption, increasing its times the resorption bony, alkalosis systemic, hypercalcemia, hyperphosphatemia, tissue calcification bland, hypercalciuria and nephrolithiasis. The severity and the signs clinicians they vary with the species, dose, route and circumstances, as well such as the period of administration and others components of the diet.[3] The findings pathological with hypervitaminosis D may be: elevated calcium and phosphorus levels in serum, BUN, creatinine and severe mineralization of tissue bland, especially in kidneys, gastrointestinal tract, muscle cardiac and skeletal, tendons and ligaments.[13,14]

The mineralization of the fabric soft is divided in dystrophic and metastatic. The mineralization dystrophic this associated with calcium deposition, amountstraces of iron, magnesium and other mineral salts in tissues necrotic or degenerate. The mineralization metastatic occurs in tissues that resemble microscopically normal and generally are associated with the disorder of the calcium metabolismassociated with hypercalcemia.[15]

Historically they have reported cases of hypervitaminosis D and calcium metastases in various rodents such as groundhogs, beavers, etc. Fed with concentrate commercial for primate, with high contents of vitamin D3.[3,6,10,15,16] Kenny and Klein[13,15] considered that tissue mineralization soft occurred in tepezcuintles was derivative of a origin vitamin D toxicity dietetic. The rodents of the new world appear to be to have evolved systems physiological that do efficient the absorption of calcium and phosphorus, requiring a level low or null vitamin D3.[13]

## Conclusion

So much the tepezcuintles maintained in the collection since 1997 as the donated in the 2005 (maintained on the terrace of a house), were supplied with solar light. This is solar exposure seems not to be suitable for animals terrestrial nocturnals the which in life free have a solar exposure of 2% which supports the theory that the rodents of the new world appear to be to have evolved systems physiological that do efficient the absorption of calcium and phosphorus,

requiring a level low or null vitamin D3.

The tepezcuintles were fed with a diet based in concentrate, vegetables and fruits they are doing it their requirements in the tables of the NRC for laboratory animals. The vitamin D levels contributed by the concentrate were elevated being able to have induced tissue mineralization soft; however the specimens fed with fruits and vegetables (group granted 2005) as well presented mineralization of tissue bland is important note that both groups were sheltered in displays with solar exposure, which led to a absorption exaggerated vitamin D and by consequence deposition of calcium in fabric bland.

## Acknowledgements

None

## Conflicts of interests

Authors have declared no conflict of interest in this manuscript.

## Ethical approval

Ethical approval was not required as human samples were not involved.

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