
Lead Effects in Bone Structure as a Possible Factor for Osteoporosis

Sonia Cortés Trinidad, Elliette Hernández Calero, and Wilmarie Rivera Otero,
Medical Geology Workshop, November 17, 2005

INTRODUCTION

- Osteoporosis
 1. Definition
 2. Symptoms
 3. Consequences
 - Lead
 1. Definition
 2. Toxicology
 3. Consequences
 4. Importance of study
-

OBJECTIVE

- Determine whether there is a correlation between the deposition of lead in bone structure and the development of osteoporosis in a population that has been living in a public housing project constructed before 1978, where the presence of lead has been confirmed.
-

HYPOTHESIS

- Lead bioaccumulation in bones from people living in a public housing, is associated with osteoporosis.
-

NEED FOR RESEARCH

- Osteoporosis – “silent epidemic”
 - Identify the disease in an early stage.
 - Importance of receiving medical analysis and adequate treatment in time.
 - The possible relationship between lead exposure and osteoporosis is poorly understood.
 - Studies by University of Rochester has been conducting studies comparing lead concentration in bones and the risk of osteoporosis later in life.
-

EXPERIMENTAL GROUP

- ✓ Luis Lloréns Torres Public Housing (San Juan, Puerto Rico)
 - ✓ Occupation date – September 31, 1955
 - ✓ Existence of lead confirmed by the Public Housing Administration.
 - ✓ 100 individuals between 25 and 60 years old.
 - ✓ Individuals must have been living in this housing project for at least 20 years.
-

CONTROL GROUP

- ✓ Ponce de León Public Housing (Ponce, Puerto Rico)
 - ✓ Occupation date – February 14, 1941
 - ✓ Non-existence of lead confirmed by the Public Housing Administration.
 - ✓ 100 individuals between 25 and 60 years old.
 - ✓ Individuals must have been living in this housing projects for at least 20 years.
-

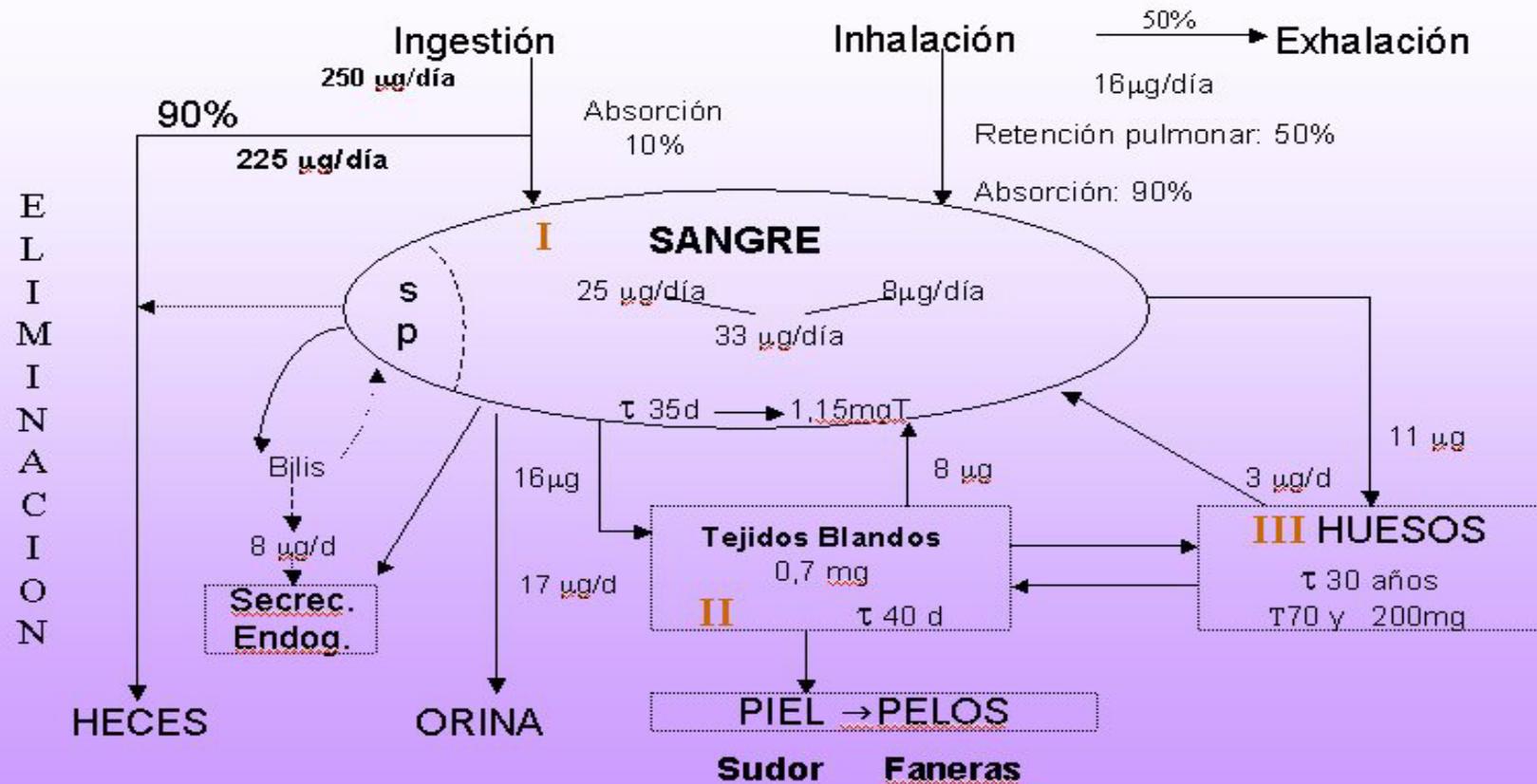
PROJECT DESCRIPTION

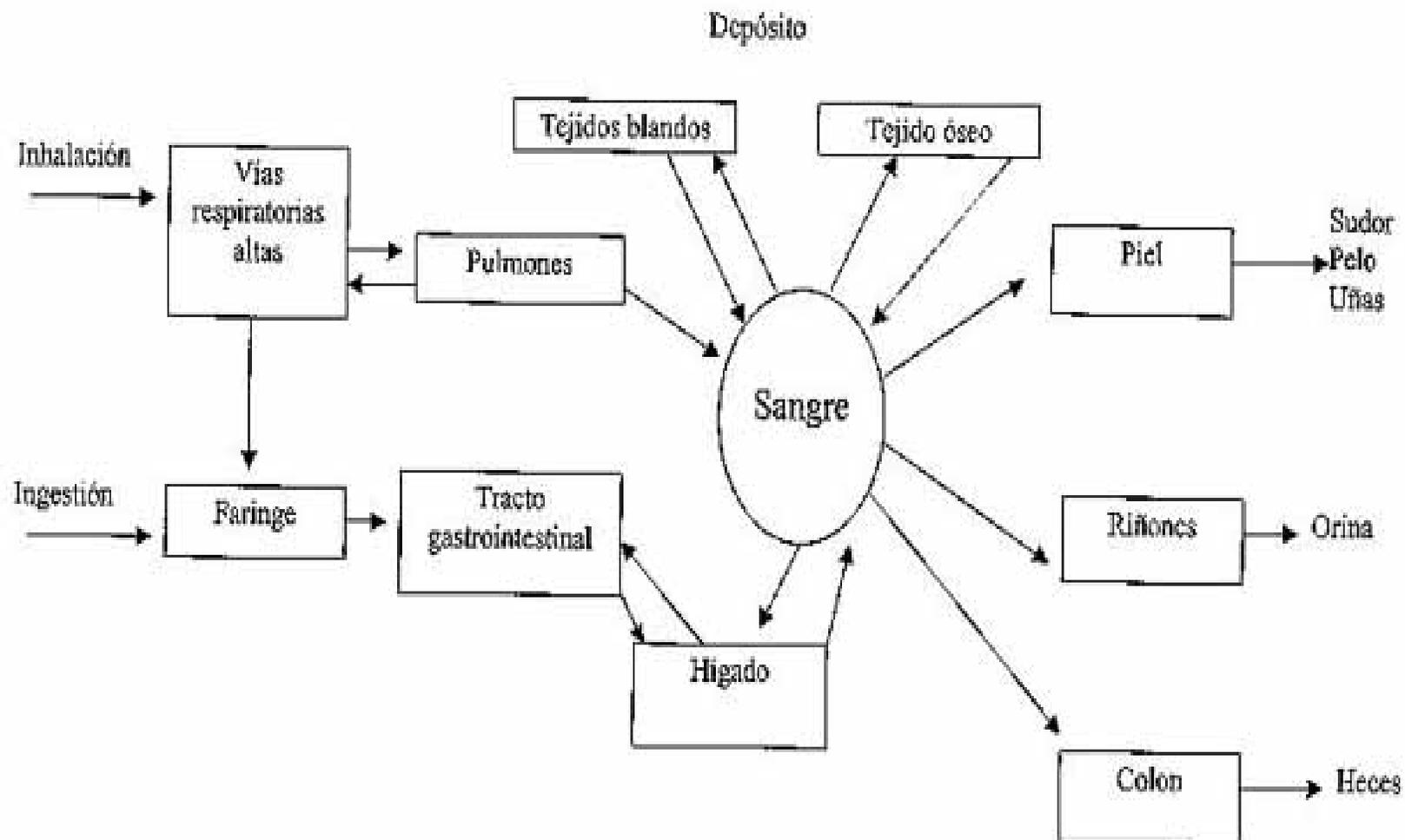
- Interview and administration of structured questionnaire.
 - Identify the individuals to participate in the project.
 - Orientate the group to be studied.
 - Laboratory analysis.
-

METHODOLOGY

- Identify presence of lead in blood samples.
 - Osteoporosis examined by X-ray analysis.
 - Densitometry of bone.
 - The data from both sources will be sorted by gender, age; presence of lead and densitometry results.
-

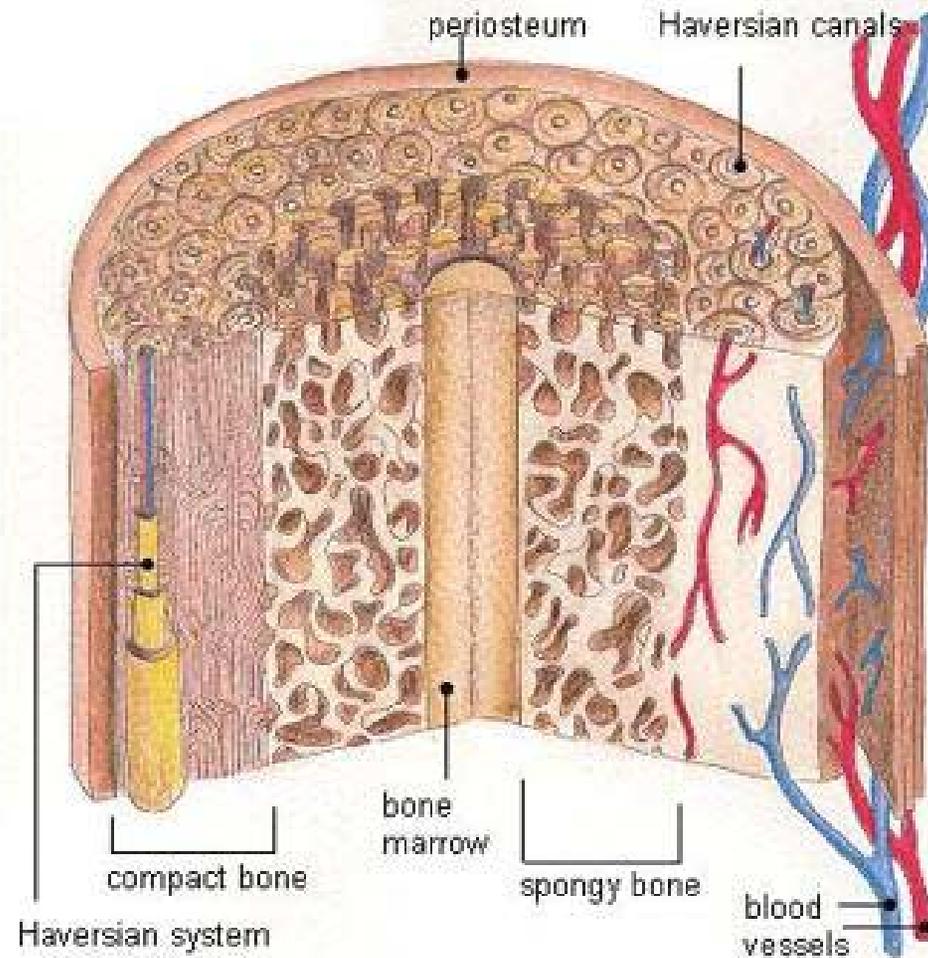
“POOLS” Y DESTINO DEL Pb





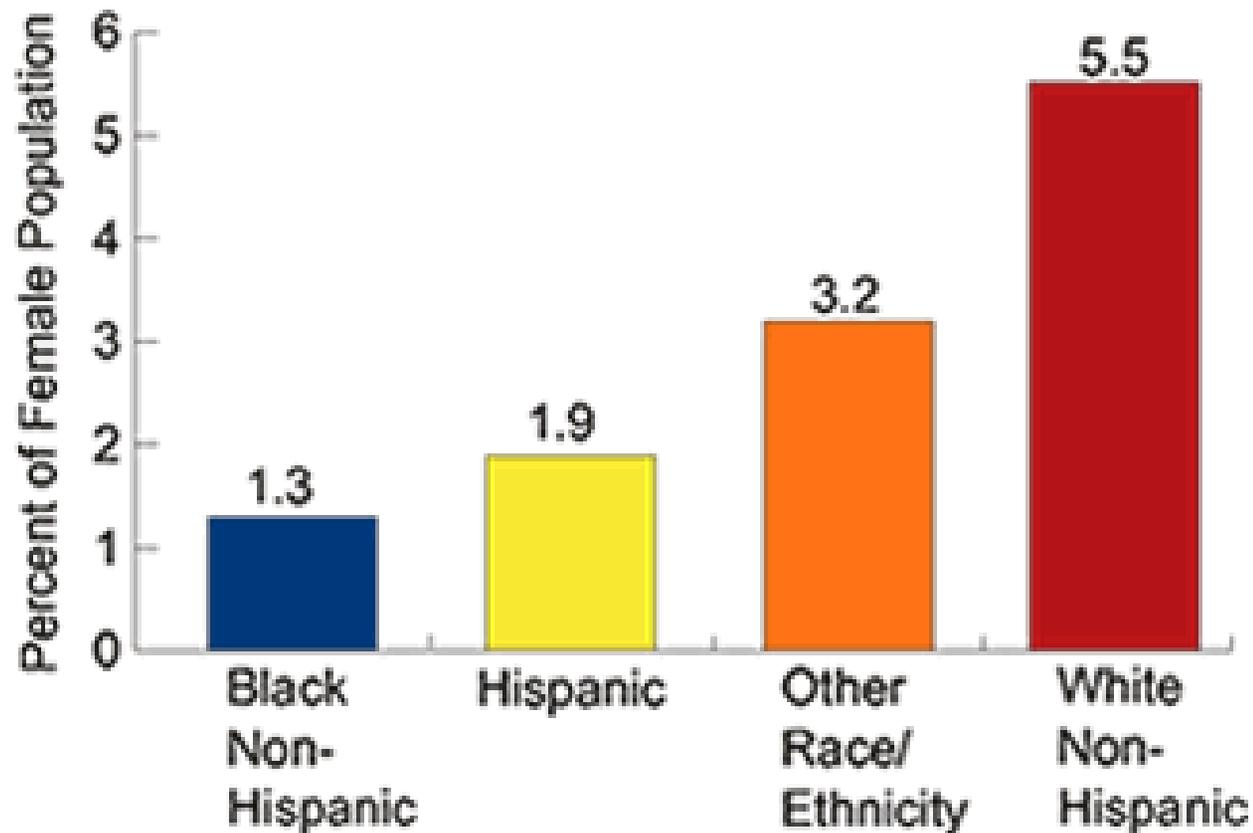
Fuente: Hemberg, S. (1988). Lead. In: Occupational Medicine. C. Zenz, ed. Chicago, Ill.: Mosby

Bone Structure

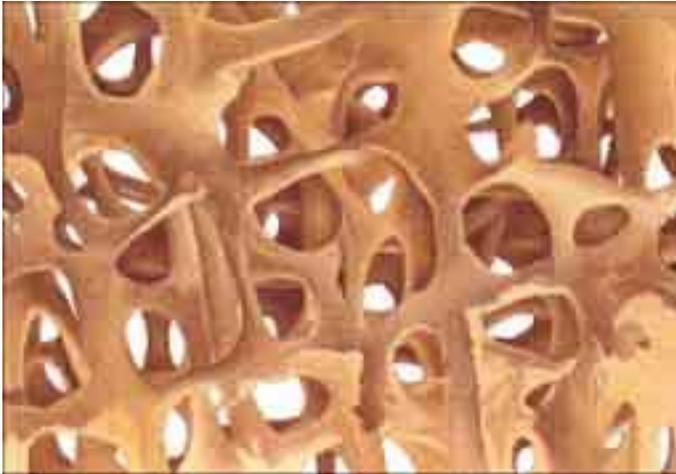


Females Diagnosed with Osteoporosis, by Race and Ethnicity, 1999

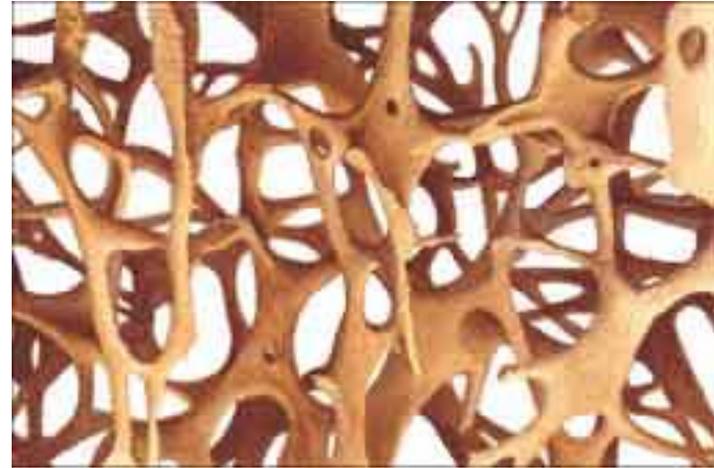
Source (II.20): National Health Interview Survey



NORMAL BONE



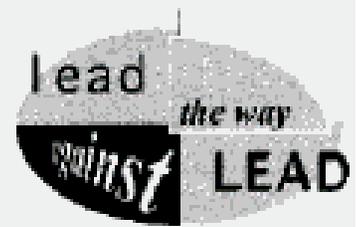
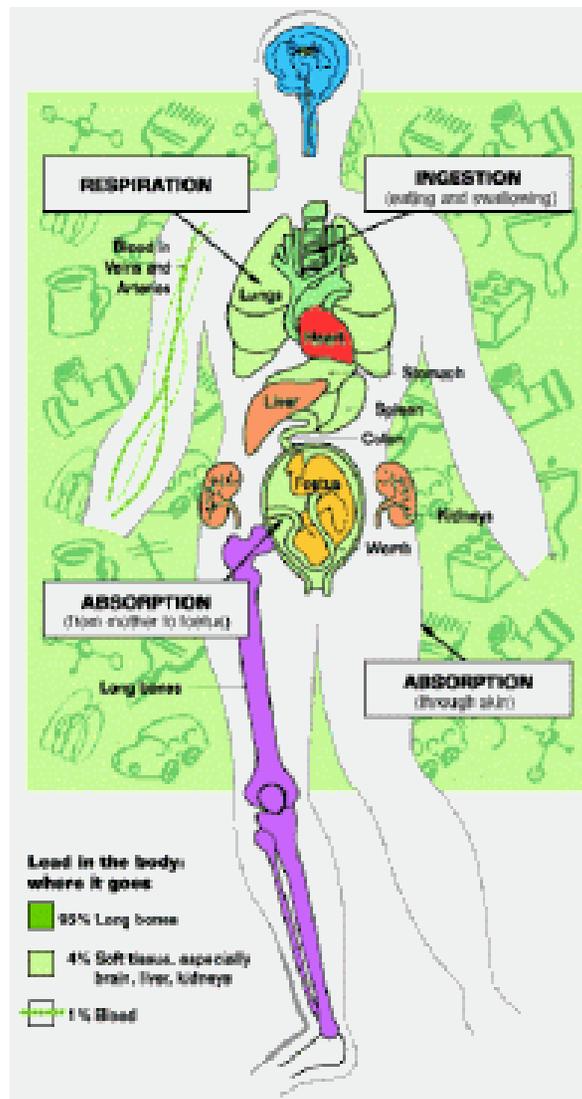
**BONE WITH
OSTEOPOROSIS**



Absorption of Lead



<http://www.lead.org.au/bblp/sld007.htm>



Distribution of Lead

- ❖ 95% long bones.
- ❖ Binds into matrix.
- ❖ Released during osteolysis.
- ❖ 4% brain, liver, kidneys.
- ❖ 1% blood.
- ❖ Crosses placenta, foetal BBB is open

