



# SLEEP APNEA

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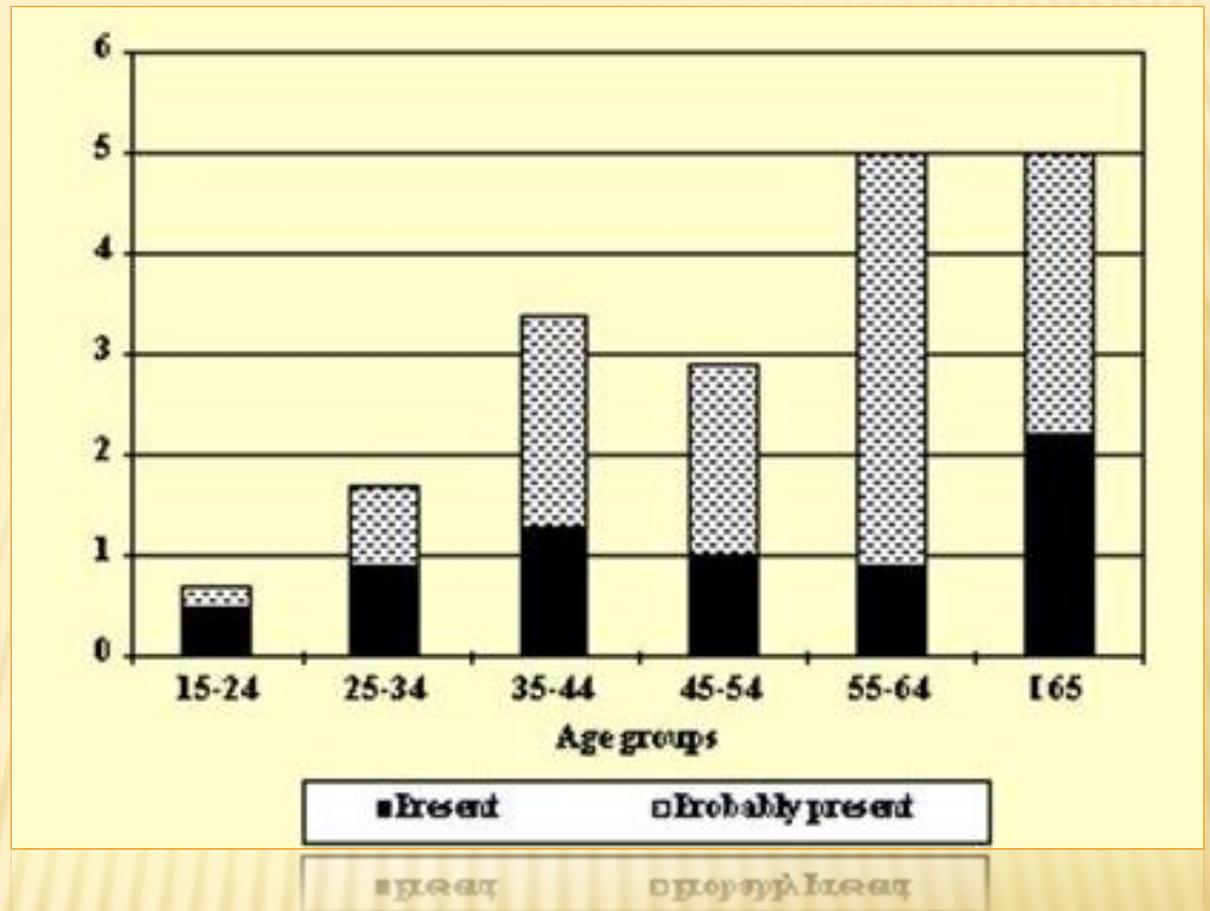
**“ THERE SHE MET SLEEP, THE  
BROTHER OF DEATH.”**

The Iliad , Homer

# APNEA

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- ❑ Absence of airflow 10 seconds or greater
- ❑ Varied pathophysiology
- ❑ Associated with cardiopulmonary sequelae
- ❑ Age and gender related variability
- ❑ Pathophysiologic consequences with increased morbidity and mortality
- ❑ 2-6% population ; depending on the study



# APNEA AND AGE

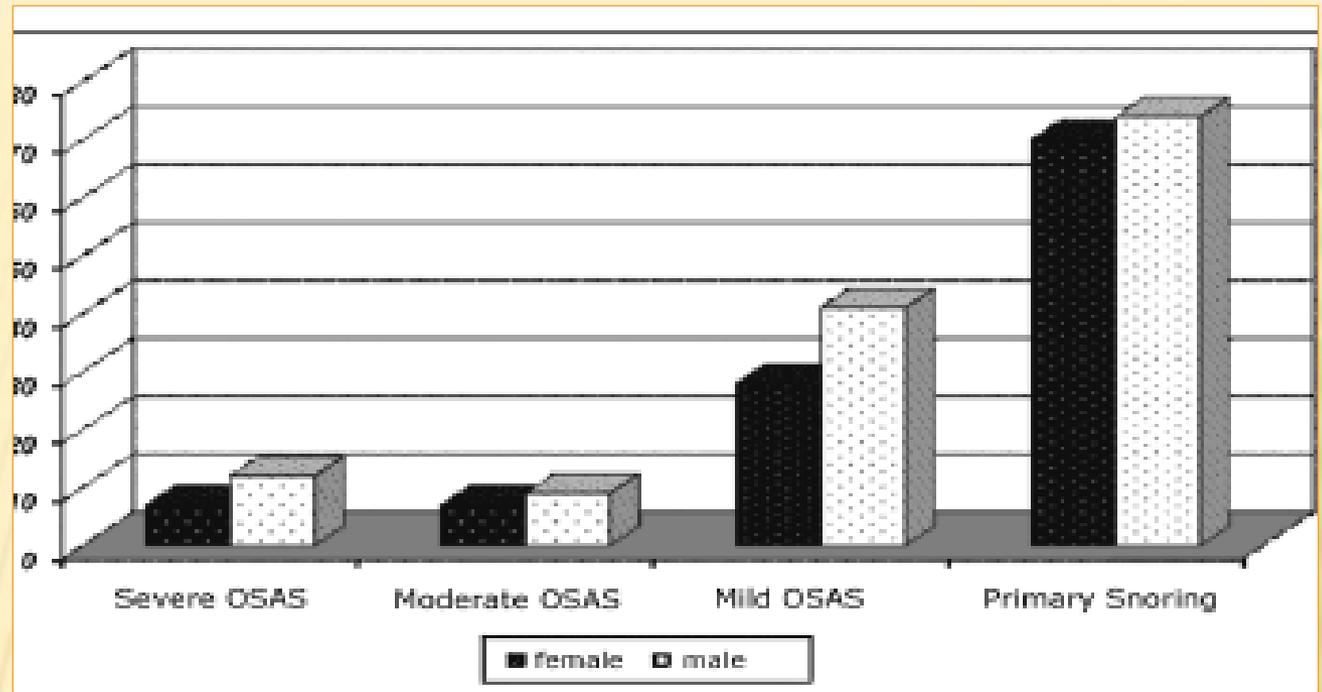


Chart 2. Distribution of sleep respiratory disorders according to age and gender.

Figure 2. Distribution of sleep respiratory disorders according to age and gender.

# APNEA BASED ON GENDER AND AGE

# APNEA

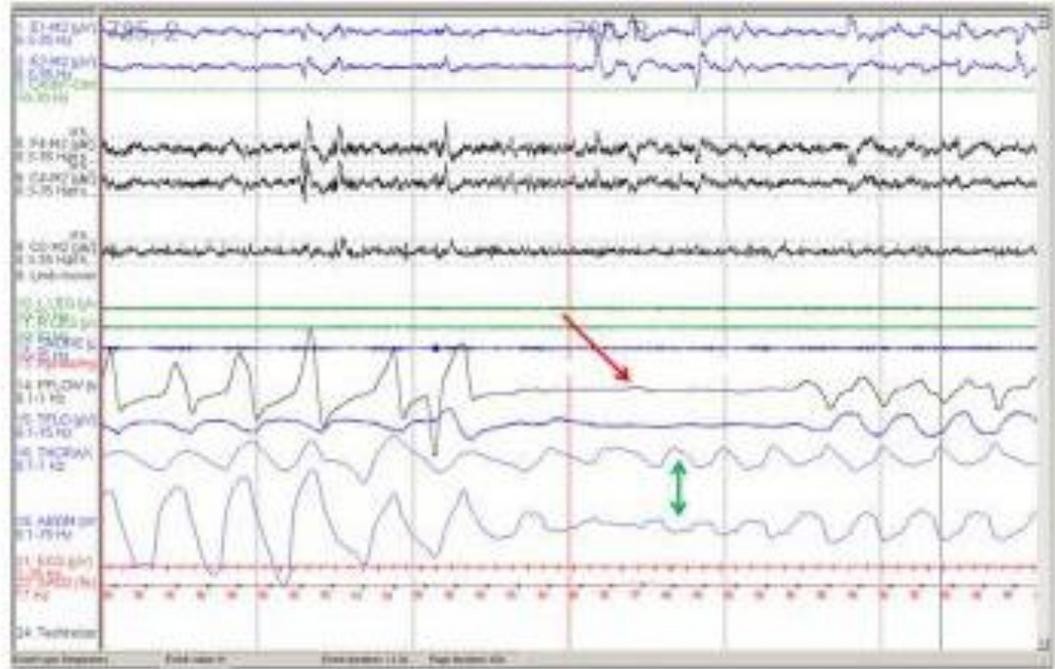
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- ❑ Absence of airflow 10 seconds or greater
- ❑ Associated with cardiopulmonary sequelae
- ❑ Age and gender related variability
- ❑ Defined pathophysiology
- ❑ Pathophysiologic consequences with increased morbidity and mortality
- ❑ 2-6% population ; depending on the study

# APNEA

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- ❑ Obstructive...” can’t “
- ❑ Central... “ won’t”
- ❑ Mixed... both



# OBSTRUCTIVE SLEEP APNEA

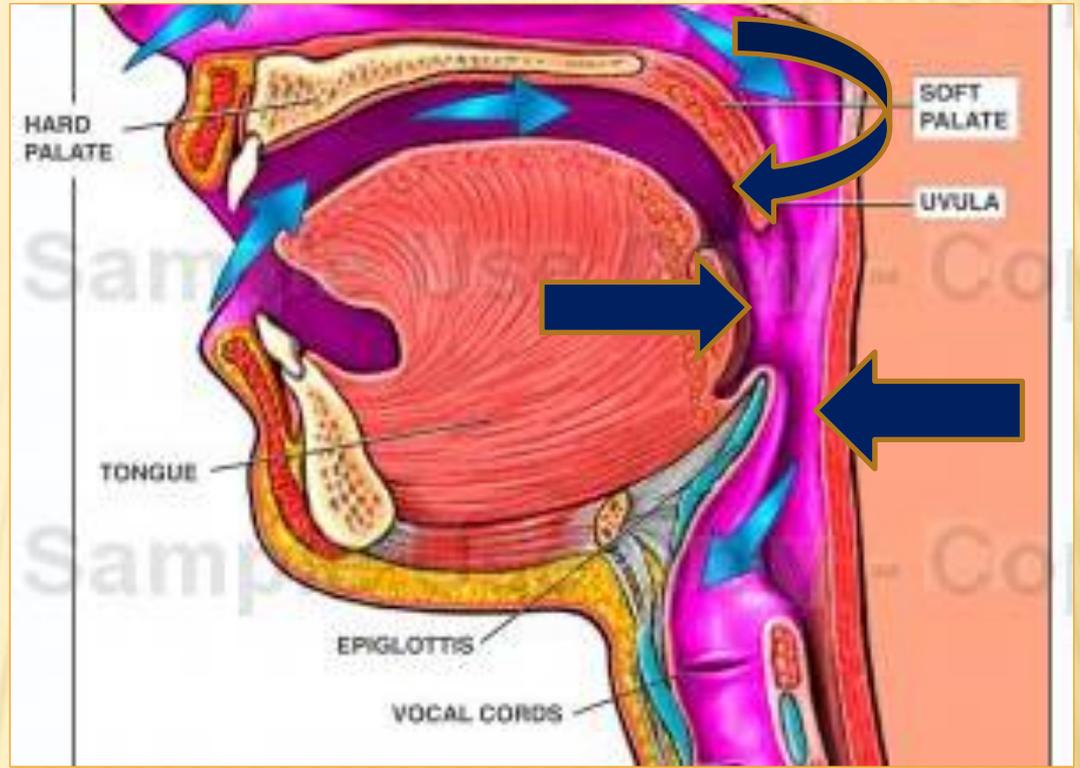
“ CAN’T “

# OBSTRUCTIVE SLEEP APNEA

- ❑ Variable Upper Airway Obstruction
- ❑ Altered Central Chemosensitivity
- ❑ Altered Transthoracic Pressure



**OSA's POSTER "CHILD"**



# UPPER AIRWAY

# SIZE DOES MATTER...



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**RESISTANCE = 1/RADIUS (4)**

# OBESITY IN OSA



- ❑ Upper Airway Shorter
- ❑ Elevated Diaphragms
- ❑ Reduced FRC
- ❑ Increased Trans-diaphragmatic Pressure
- ❑ Reduced Compliance
- ❑ Reduced  $V_e$
- ❑ Altered chemosensitivity

# CHEMOSENSITIVITY

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- ❑ **HYPOXIA**
- ❑ **HYPERCAPNEA**
- ❑ **ELEVATED AROUSAL THRESHOLD**

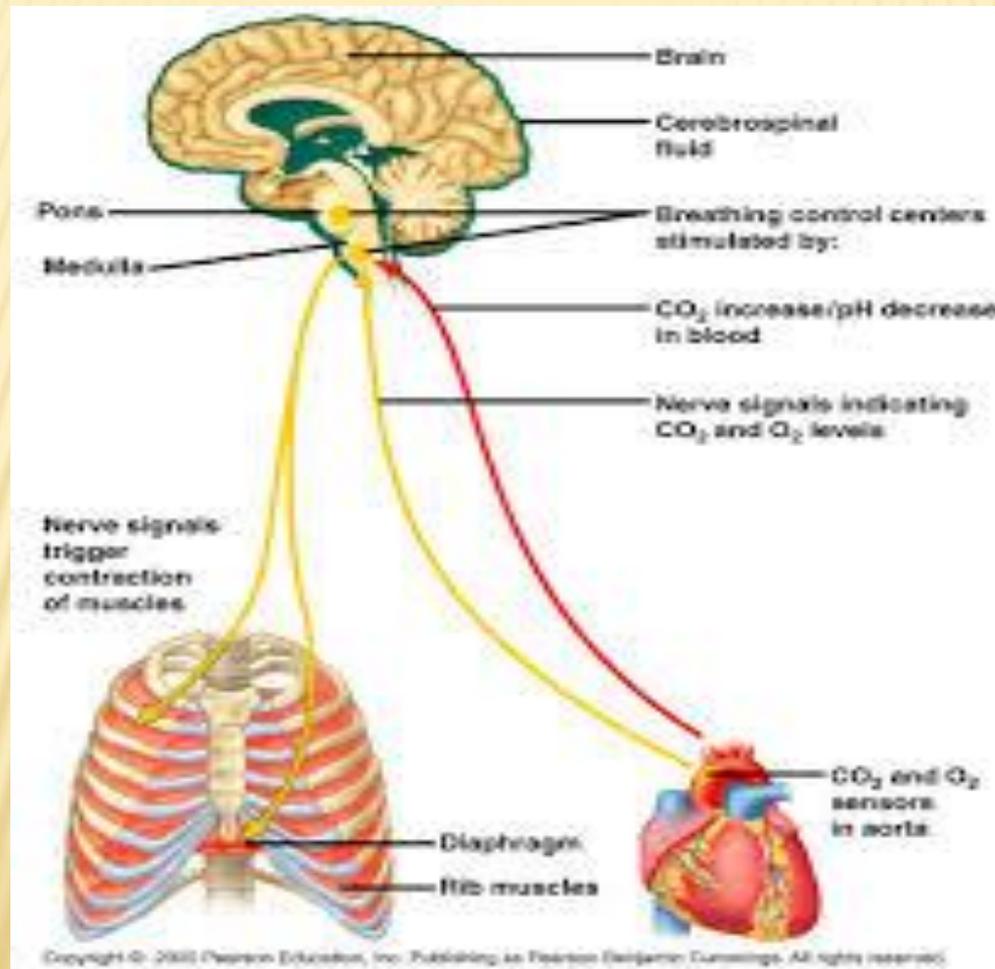


# WHY ??

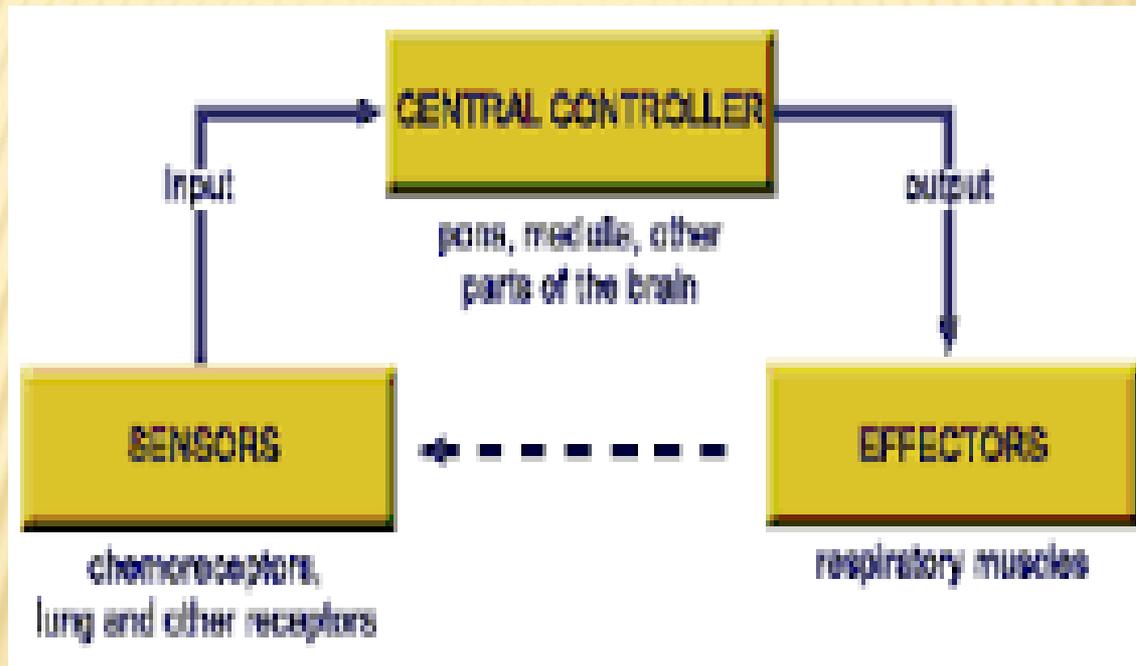
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- ❑ **DRUGS**
- ❑ **MYXEDEMA**
- ❑ **CARDIOMYOPATHY**
- ❑ **PRIMARY CNS PATHOLOGY**
- ❑ **INCREASED INTRACRANIAL PRESSURE**
- ❑ **MORBID OBESITY**

# CONTROL OF BREATHING



# CENTRAL CONTROL OF BREATHING



# WHY ??

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- ❑ **MYXEDEMA**
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# CARDIOMYOPATHY

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- ❑ **Decreased CO**
- ❑ **Decreased CNS perfusion**
- ❑ **Prolonged Transit Time**
- ❑ **Altered Chemosensitivity and Responsiveness**
- ❑ **Altered Arousal Threshold**



**CARDIOMYOPATHY IN CSA**

# AMPLITUDE AND RATE OF RESPONSIVENESS PROPORTIONAL TO EF



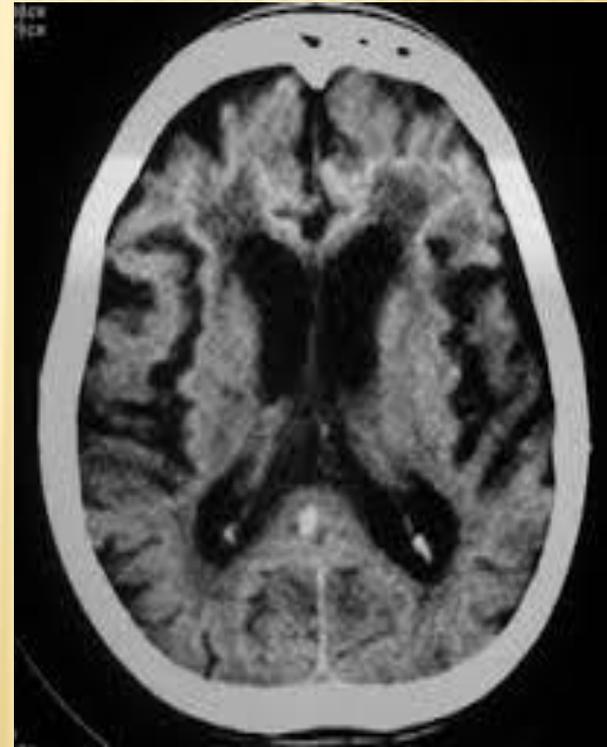
CARDIOMYOPATHY

# WHY ??

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- ❑ **DRUGS**
- ❑ **MYXEDEMA**
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- ❑ **PRIMARY CNS PATHOLOGY**
- ❑ **INCREASED INTRACRANIAL PRESSURE**
- ❑ **MORBID OBESITY**

# CENTRAL ETIOLOGIES OF CSA



# MIXED SLEEP APNEA

**BOTH...**

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# CARDIOVASCULAR CONSEQUENCES

- ❑ HYPERTENSION
- ❑ DIASTOLIC FAILURE (HFpEF)
- ❑ ARRHYTHMIA...A FIB
- ❑ CVA
- ❑ PAH
- ❑ COR PULMONALE



**Up to 60% of unexplained A Fib may be due to Sleep Apnea...”Lone “Atrial Fibrillation**

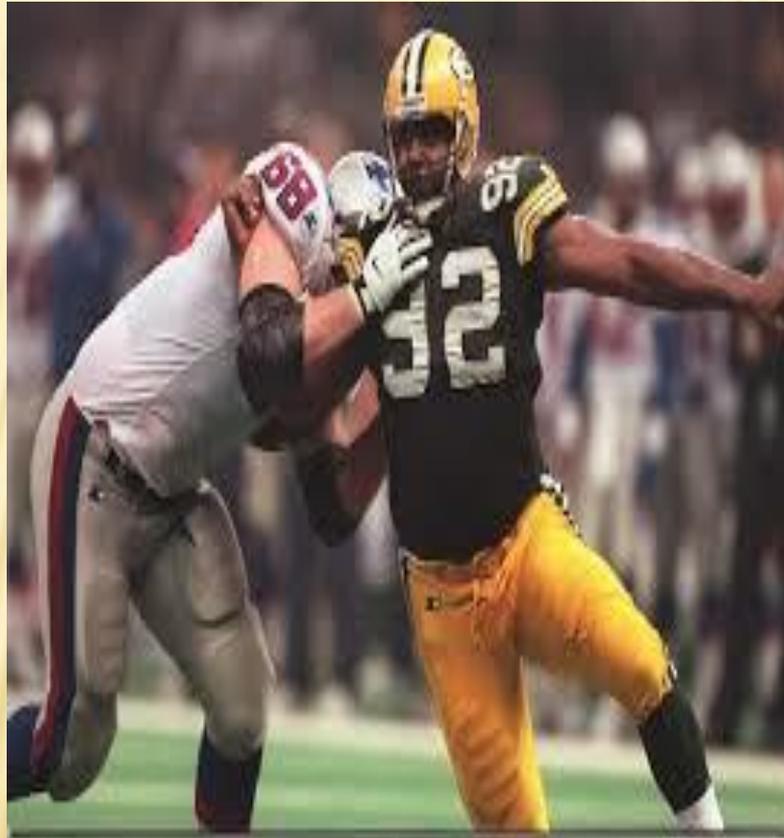
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# COR PULMONALE



# AND SUDDEN DEATH....



# OTHER CONSEQUENCES

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- ❑ **Kidney...Stones / CKD / Edema**
- ❑ **Metabolic...DM/ Lipids/ Gout / Obesity**
- ❑ **Ophthalmologic...Glaucoma**
- ❑ **ED and loss of libido**
- ❑ **Depression**
- ❑ **Increased MVA and Workplace accidents**
- ❑ **Poor job performance and increased absenteeism**

# LATEST RESEARCH....

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- ❑ Increased systemic inflammatory response
- ❑ Altered immunoresponsiveness
- ❑ Accelerated apoptosis
- ❑ Increased risk of malignancy

Yeah, well, you know, that's just,  
like, your opinion, man.

