

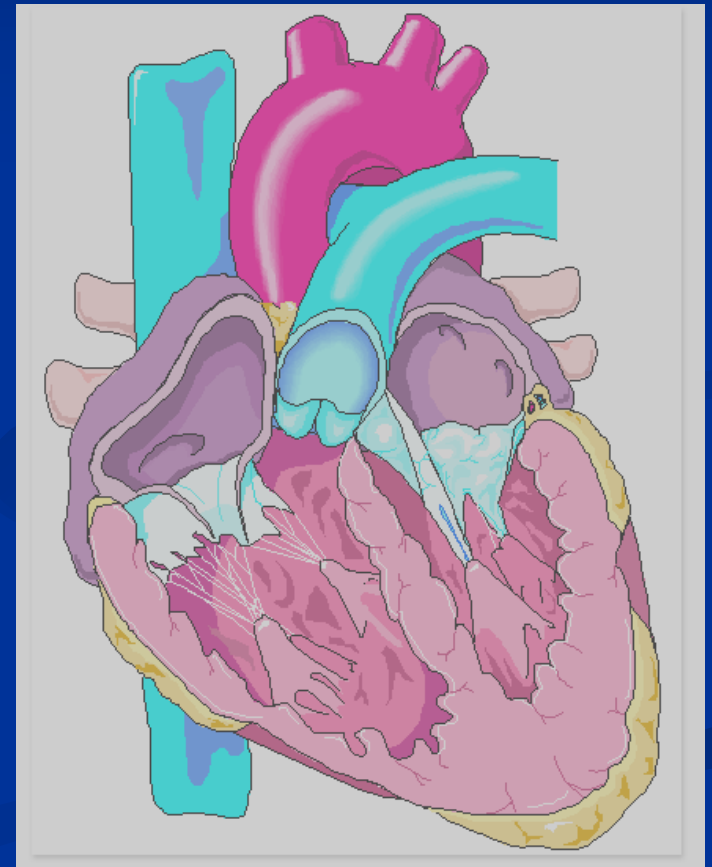
**WHAT IS THE ROLE OF DIGITALIS IN  
THE TREATMENT OF HEART  
FAILURE IN SINUS RHYTHM ?**

**WHAT IS THE ROLE OF DIGITALIS IN THE TREATMENT OF  
HEART FAILURE IN SINUS RHYTHM ?**

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**SSMC**

# Definition

- Definition:
- Heart failure is the inability of the heart to maintain an output adequate to meet the metabolic demands of the body.



# Many etiologies of CHF

- Coronary artery disease
- Hypertension
- Valvular heart disease
- Congenital heart disease
- Toxins
- Peripartum cardiomyopathy
- Many others

McMurray, Pfeffer. JACC 2004;44:2398-405

Pinski. JAMA 2003;289:754-6

Schmitt. Science 2003;299:1410-3

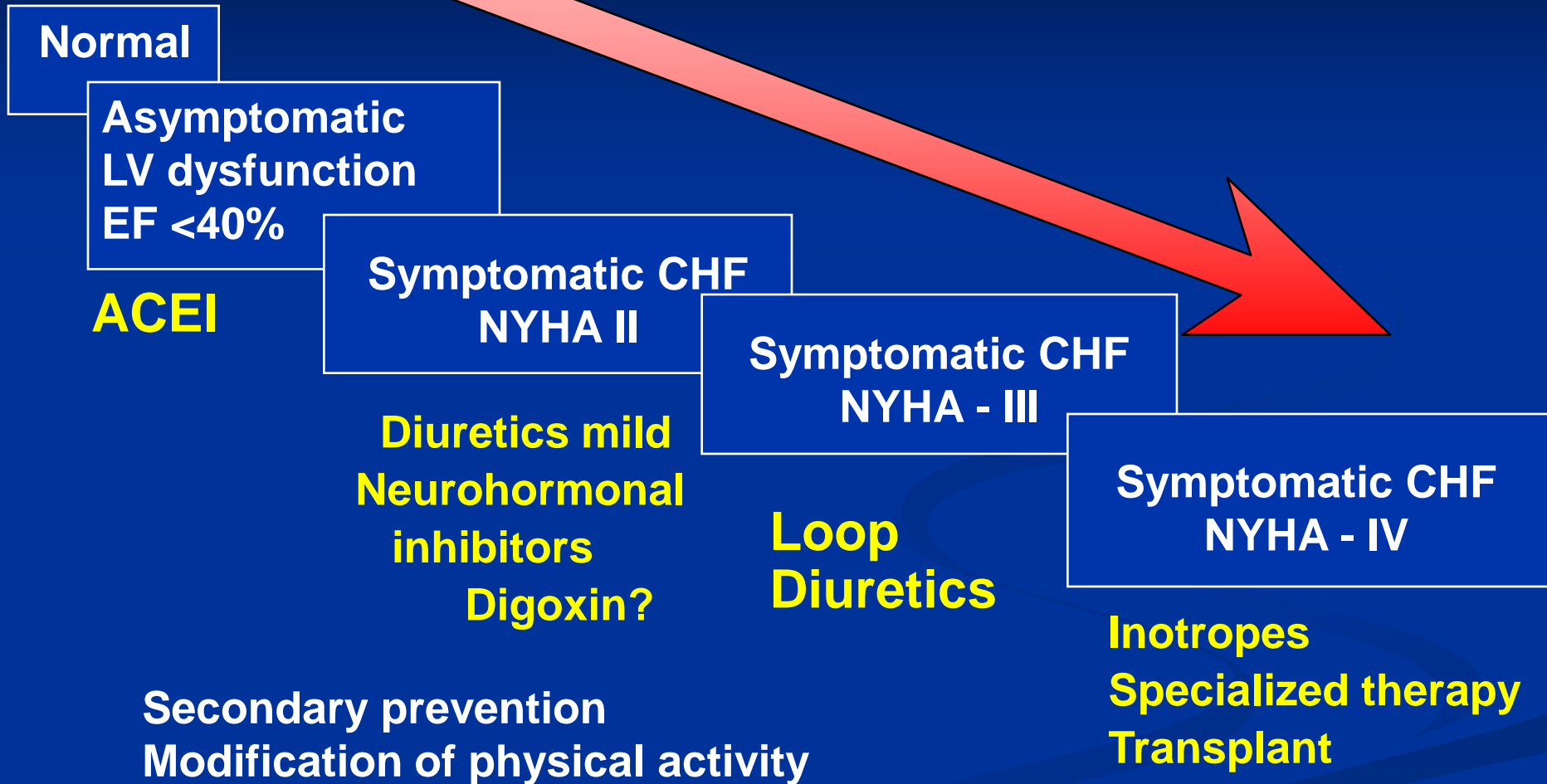
# NYHA Classification

- Class I
  - Asymptomatic
- Class II
  - Symptoms with moderate exertion
- Class III
  - Symptoms with minimal exertion
- Class IV
  - Symptoms at rest

# Drugs for CCF

- Vasodilators – ACE Inhibitors
- Diuretics
- Beta blockers
- Digoxin
- Other Cardiac Inotropes – Dobutamine, Milrinone

# TREATMENT



# PHARMACOLOGIC THERAPY

	Improved symptoms	Decreased mortality	Prevention of CHF	Neurohumoral Control
DIURETICS	yes	?	?	NO
DIGOXIN	yes	=	minimal	yes
INOTROPES	yes	↑ mort.	?	no
Vasodil.(Nitrates)	yes	yes	?	no
ACEI	yes	YES	yes	YES
Other neurohormonal control drugs	yes	+ / -	?	YES



# Digoxin

- Used in heart failure for more than 200 years
- Improves symptoms for patients on diuretic and ACE inhibitor
- No overall impact on survival



## Cardiac glycosides : Digoxin :

- Inhibition of Na/K ATPase pump increase intracellular sodium concentration – eventually increase cytosolic calcium.
- It restores the vagal tone and abolishes the sympathetic over activity.

**DIGOXIN**



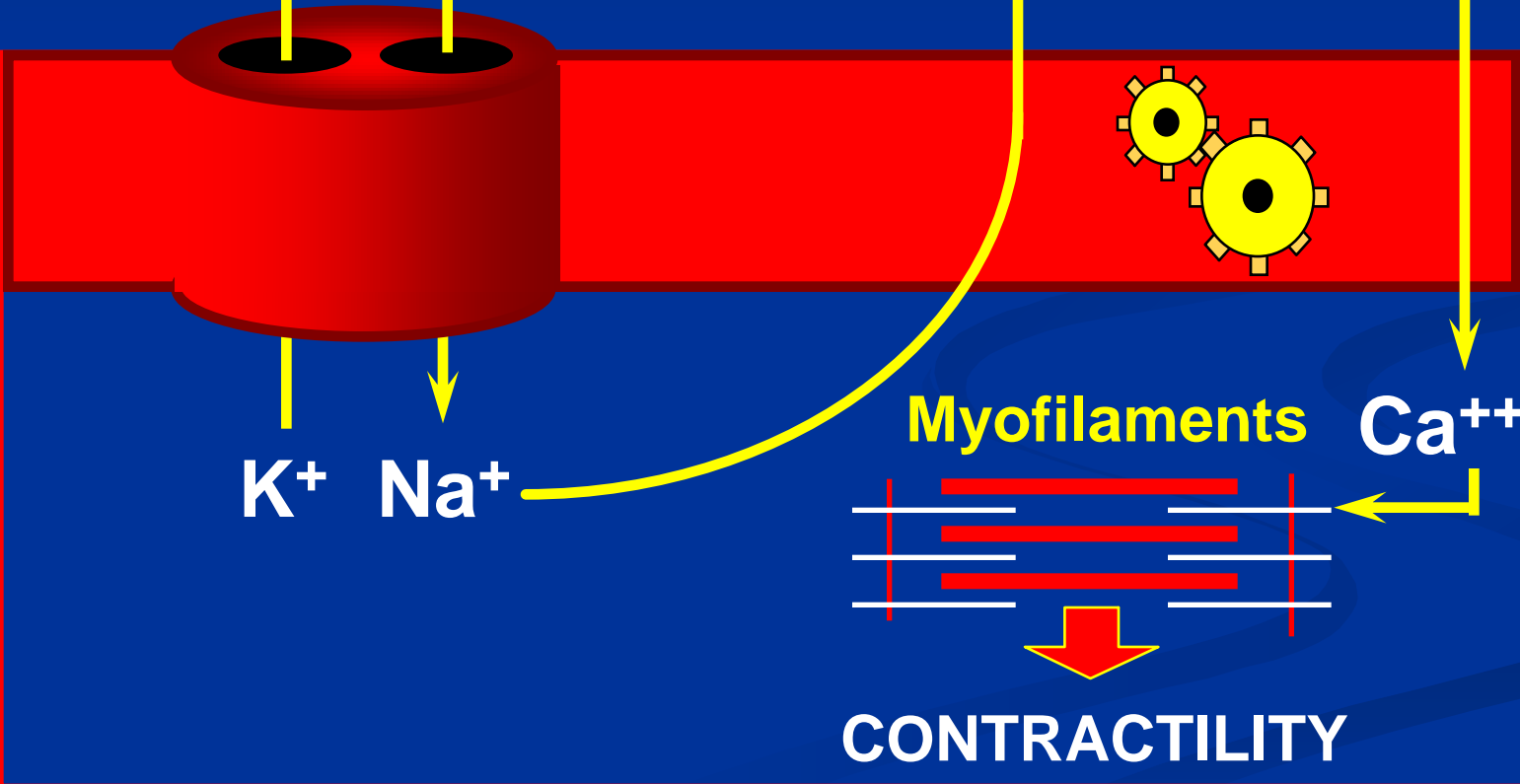
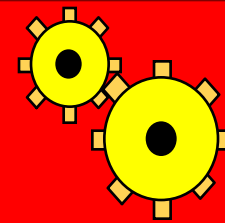
**Na-K ATPase**

**Na<sup>+</sup> K<sup>+</sup>**



**Na-Ca Exchange**

**Na<sup>+</sup> Ca<sup>++</sup>**



# DIGOXIN

## HEMODYNAMIC EFFECTS

- ↑ Cardiac output
- ↑ LV ejection fraction
- ↓ LVEDP
- ↑ Exercise tolerance
- ↑ Natriuresis
- ↓ Neurohormonal activation

# Debate

MacKenzie and Lewis have taught generations of British medical students that digitalis was of little value unless the patient was in atrial fibrillation

# Evidence

Positive inotropic effect of Digoxin has been documented both in failing & non failing human heart by –

- *Braunwald & Colleagues-*
  - by measuring the left ventricular peak diastolic pressure
- *Sonnenblick et al 1966-*
  - Myocardial force velocity
- *Weissler et al 1966-*
  - Measurement of systolic time interval

# When to use Digoxin in sinus rhythm ?

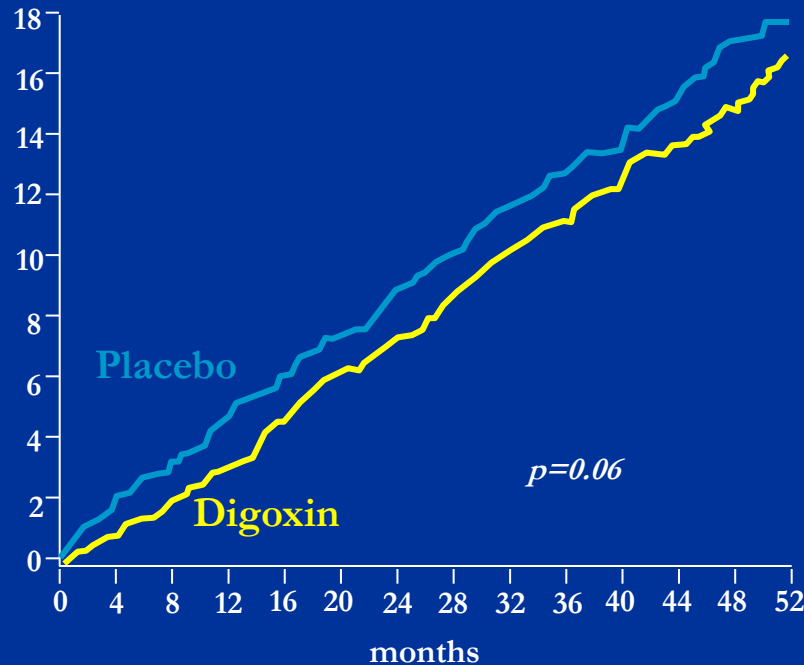
Indications :

- ischaemic
- primary myocardial disease
- symptoms and signs cannot be controlled with a diuretic alone
- persisting cardiomegaly and gallop rhythm

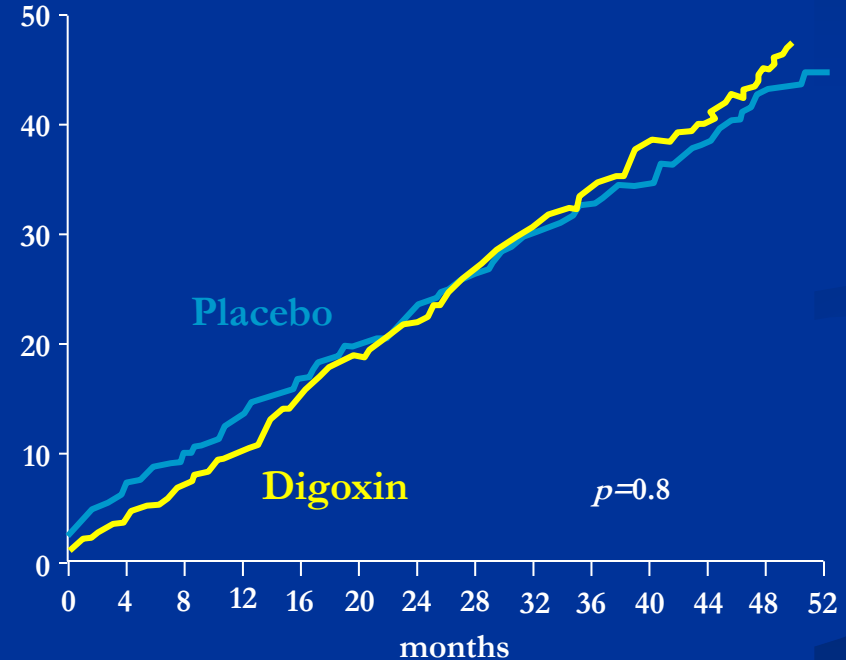
# The Digitalis Investigation Group

## Mortality Due to Worsening HF

Mortality Due to Worsening Heart Failure (%)



## Total Mortality



n=6800 patients, EF <45%, normal sinus rhythm

*NEJM*. 1997;336:525.



Thank You