

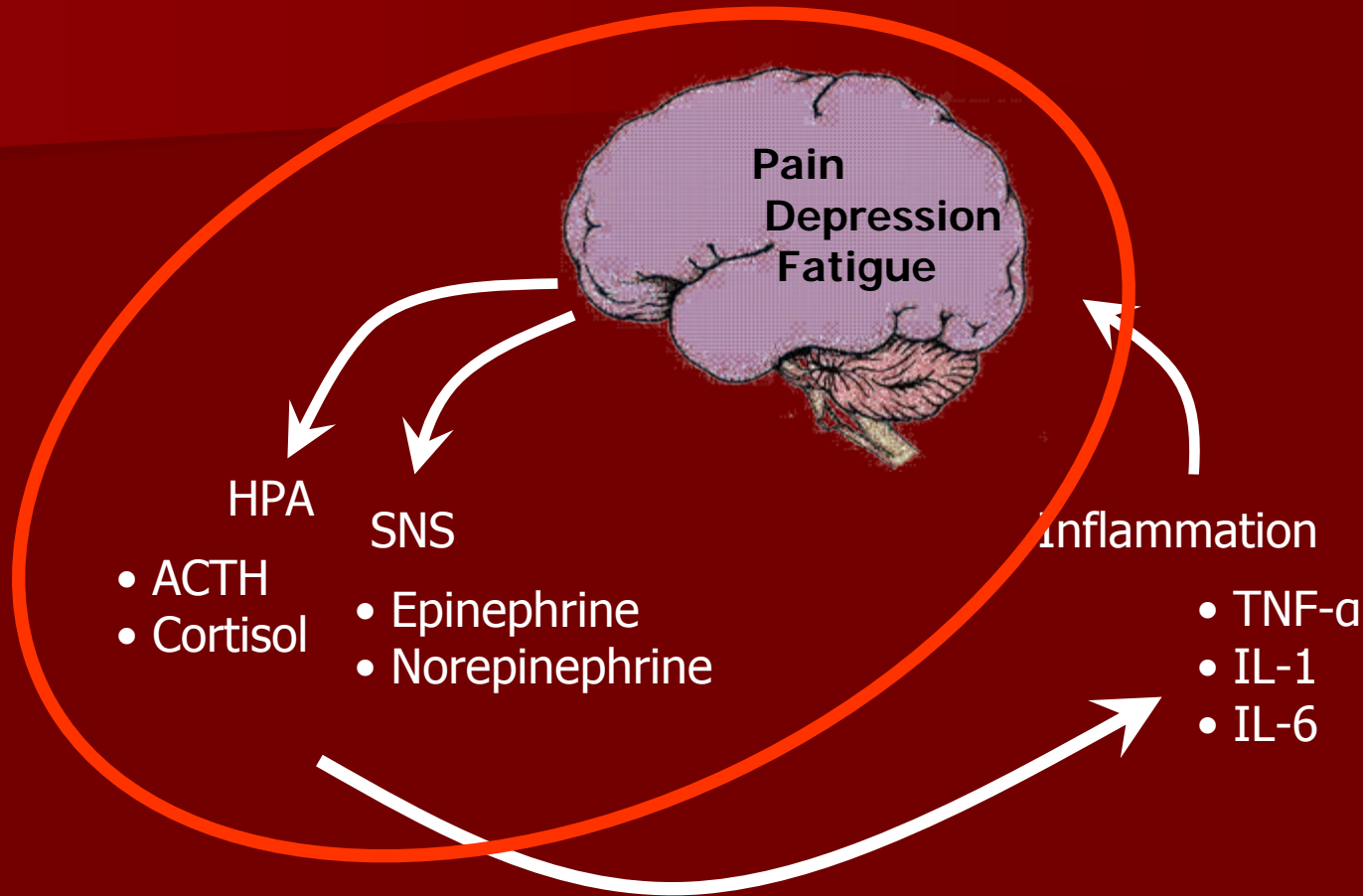
# The Pain, Depression, and Fatigue symptom cluster: Covariation with stress hormones

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# Background

- Pain Depression and Fatigue (PDF) are common and debilitating symptoms among cancer patients.
- Clinical data suggest these symptoms often co-occur. A "Symptom Cluster".
- There may be a biological basis for their covariation.
- Neuroendocrine-immunologic models have been proposed.

# Neuroendocrine-Immune Model



Adapted from models by Cleeland et al., 2003; Dantzer et al., 2008; Miller et al., 2008.

# Study Aims

- Studying cancer patients troubled with these symptoms, we test the hypothesis that the PDF cluster covaries with hormones of the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system.

# Method

- Cross-sectional
- Survey data
  - Pain – Brief Pain Inventory
  - Depression – CES-D
  - Fatigue – Fatigue Symptom Inventory
- Serum Hormone Levels
  - ACTH
  - Cortisol
  - Epinephrine
  - Norepinephrine

# Participants

- N=104 patients
- Recurrent (n=80) or metastatic (n=24) breast cancer.
- Median 8 weeks after diagnosis
- Caucasian (89%), African-American (11%)
- Age: mean=53, SD=11 years
- 78% post-menopausal
- 85% treated
  - surgery 24%, chemotherapy 61%, radiation 15%, and/or hormonal therapy 22%

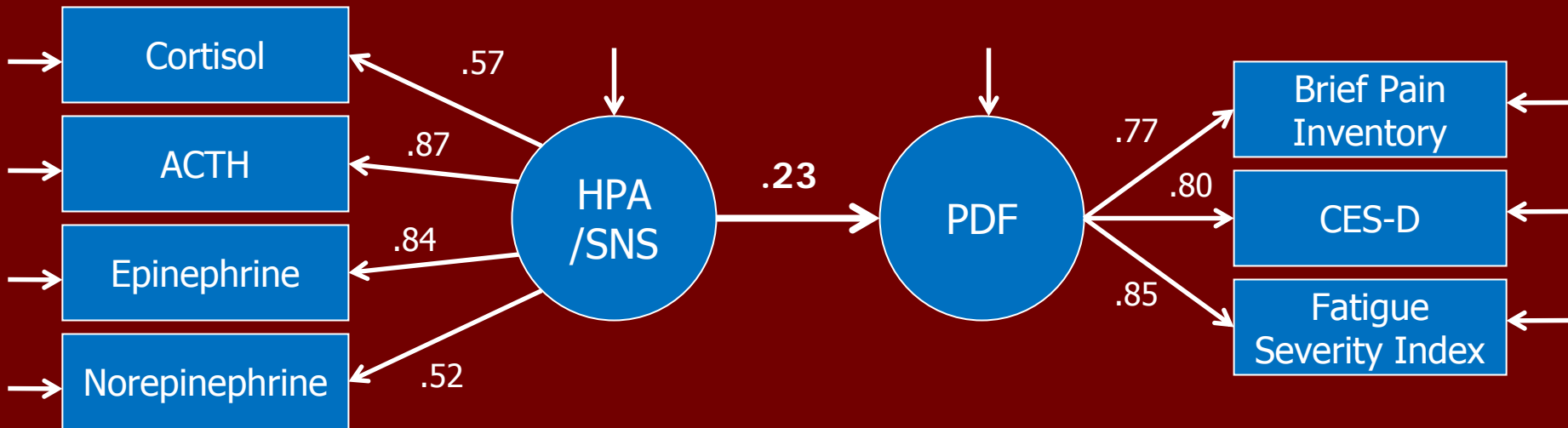
# Descriptive Data

- Brief Pain Inventory
  - 55% reported pain
  - Average pain interference 2.6 out of 10
- CES-D
  - Mean = 13.6
  - 36% scored above the clinical cutoff
- Fatigue Symptom Inventory
  - 84% reported fatigue
  - Average fatigue interference 3.6 out of 10

# Preliminary Analysis

	1.	2.	3.	4.	5.	6.
<b>Behavioral</b>						
1. Pain (BPI)						
2. Depression (CES-D)	.62*					
3. Fatigue (FSI)	.65*	.70*				
<b>Endocrine</b>						
4. Cortisol	.34*	.35*	.29*			
5. ACTH	.20	.16	.22 <sup>†</sup>	.56*		
6. Epinephrine	.30*	.28*	.37*	.45*	.75*	
7. Norepinephrine	-.01	.06	-.03	.31*	.47*	.47*

# Latent Variable Analysis

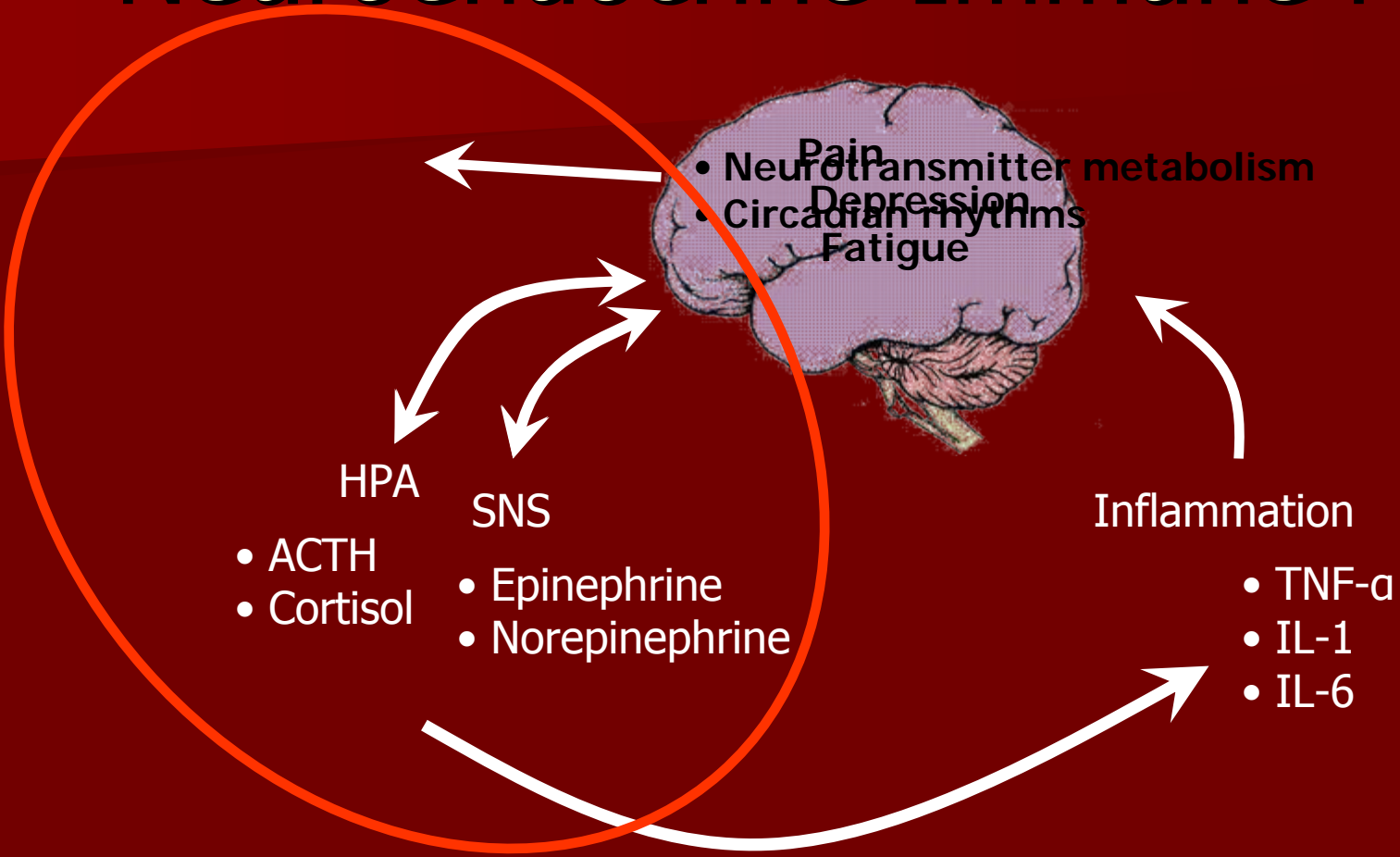


- Demographic, disease, and treatment variables controlled
- Good model fit (RMSEA=.052)

# Conclusions

- Elevated SNS and HPA axis hormones explained significant shared variance in the pain, depression, and fatigue symptom cluster.
- These data confirm hypotheses derived from the neuroendocrine-immune models of cancer symptoms.

# Neuroendocrine-Immune Model



# Conclusions

- Future research may examine other measures, such as proinflammatory cytokines or acute phase proteins.
- Discovery of the psychological or biological processes that underlie a symptom cluster could aid symptom management.

# Acknowledgements

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