In addition to its common uses for the treatment of pain, morphine is used therapeutically for shortness of breath in congestive heart failure patients. However, prolonged exposure can lead to tolerance, dependence, and central nervous system (CNS) and cardiovascular (CV) alterations.

Morphine affects the CNS and CV systems via opioid receptors.

Morphine also modulates the response of dopamine receptors (DRD), particularly the D2-like family (DRD2 and DRD3).

Similarities between mu-opioid receptors (mOR) and DRD3 pathways suggest synergism.

DRD3 knockout mice show increased mOR-phosphorylation and exhibit cardiac dysfunction, myocardial fibrosis, and decreased lifespan.

The goal of this study is to determine whether the myocardial changes observed with morphine administration directly correlate with a dysfunctional dopaminergic system in the heart.

**MATERIALS & METHODS**

**STUDY DESIGN**

- 3 month old male C57BL/6J mice randomly assigned into 5 groups (n=6/group)
- All mice received morphine for 7 days (D7, 2 mg/kg/day)
- Separate cohorts received DRD3 agonist (pramipexole dihydrochloride, 0.5 mg/kg/day) as adjunct therapy:
  - G2 and G4, simultaneous to morphine treatment
  - G5 delivered only during the withdrawal period
- After 7 days of morphine administration, groups G1 and G2 were euthanized, while G3-G5 underwent 7 days of withdrawal from morphine (D14).

**OUTCOMES**

- Cardiac function by echocardiography at baseline, D7, and D14
- Picrosirius red (PSR) staining for visualization of left ventricle (LV) fibrosis
- Image Pro analysis of cross-sectional area for myocyte hypertrophy
- Immunoblot determination of protein expression; collagen 1, DRD1 and DRD3 receptors

**RESULTS**

**INTRODUCTION**

**RESULTS**

**CONCLUSION**

**REFERENCES**