

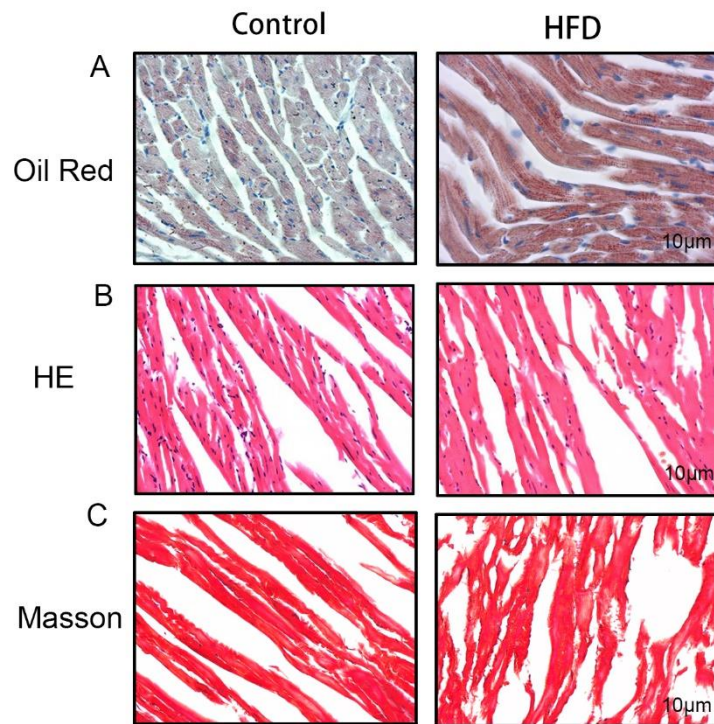
Real-time PCR analysis was performed using the following primers:

Supplementary Table.1

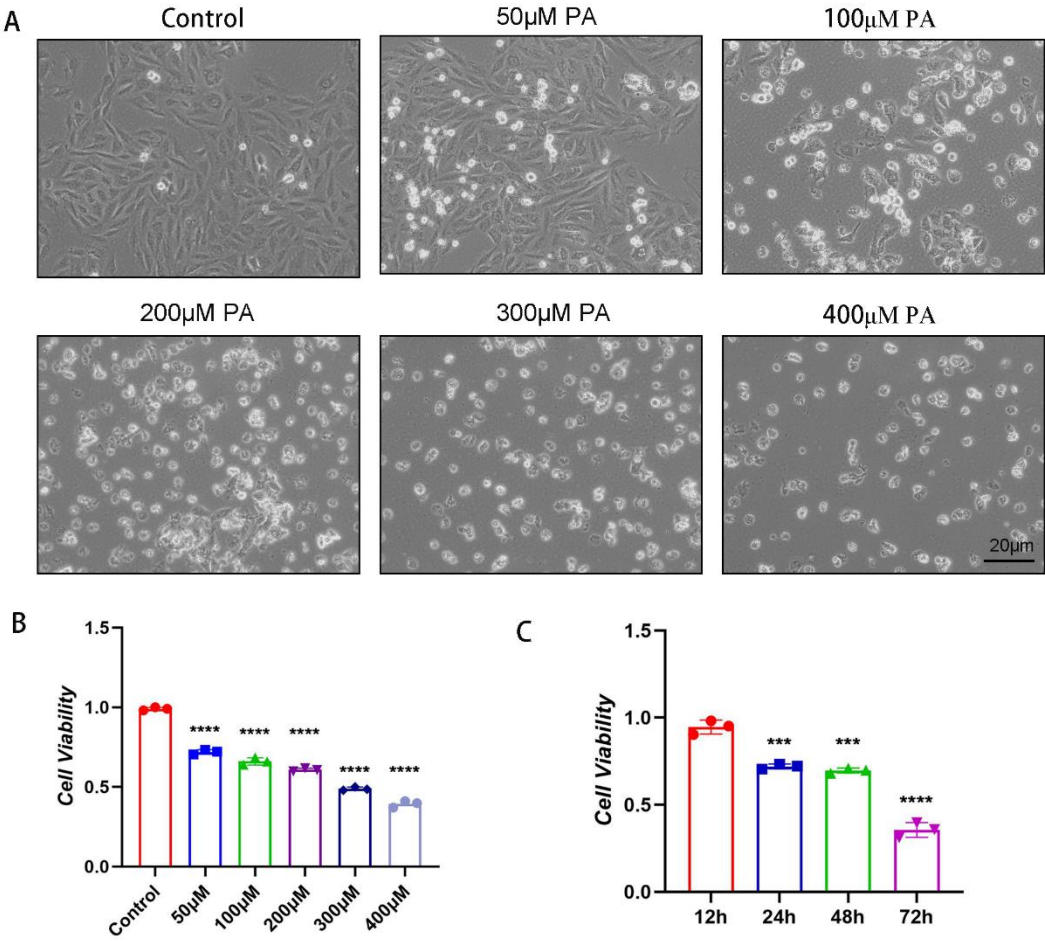
Gene	Primer sequence
Rat TNF- α	F: ATGGGCTCCCTCTCATCAGT R: TCCAGTGAGTTCCGAAAGCC
Rat IL-1 β	F: AGGCTGACAGACCCCAAAG R: CAGGGAGGGAAACACACGTT
Rat IL-6	F: CACTTCACAAGTCGGAGGCT R: AGCACACTAGGTTTGCCGAG
Rat GAPDH	F: GAGACAGCCGCATCTTCTTG R: GAGACAGCCGCATCTTCTTG
Rat Bax	F: CACGTCTGCGGGGAGTCA R: TAGGAAAGGAGGCCATCCCA
Rat Bcl ₂	F: GAGGGGCTACGAGTGGGATA R: GCATGCTGGGGCCATATAGT
Rat SOD1	F: TAACTGAAGGCGAGCATGGG R: TCCCAATCACACCACAAGCC
Rat SOD2	F: ACCGAGGAGAAGTACCACGA R: CCTGAACCTTGGA CTCCAC
Rat Nppa	F: CCTGGA CTGGGGAAGTCAAC R: GCAGCTCCAGGAGGGTATTC
Rat Nppb	F: TCCTTAATCTGTCGCCGCTG R: GGCGCTGTCTTGAGACCTAA
Rat FATP4	F: CGCTGGAAAGGGGAGAATGT R: CACTTTGGCAGCTTTGGACC
Rat FABP4	F: GCGTAGAAGGGGACTTGGTC R: CGAATTCCACGCCAGTTTG
Rat PPAR α	F: GTCCTCTGGTTGTCCCCTTG R: TGGGGAGAGAGGACAGATGG

Rat PPAR delta	F: GATGAGGACAAACCCACGGT R: CATGCACGCTGATCTCGTTG
Rat VLDLR	F: GTGCAGCTGGGTTTGAAGT R: GCTGCAATGTCAGCATCGAG
Rat ACSL1	F: GGCAGTTCGTGGATTGCAG R: CATTGCTCCTTTGGGGTTGC
Rat LPL	F: TCCCAATGGAGGCACTTTCC R: TCTGACCAGCGGAAGTAGGA
Rat FoxO1	F: CTCAGGTGGTGGAGACCGA R: GAGCTGGTTCGAGGACGAAA
Rat ABCA1	F: GCGACCATGAAAGTGACACG R: AAACCCTTTCTACTCCGCCG
Rat ABCG1	F: CTTACTCCGTACCCGAGGGA R: TCCTTGACCATCTCCCGTCT

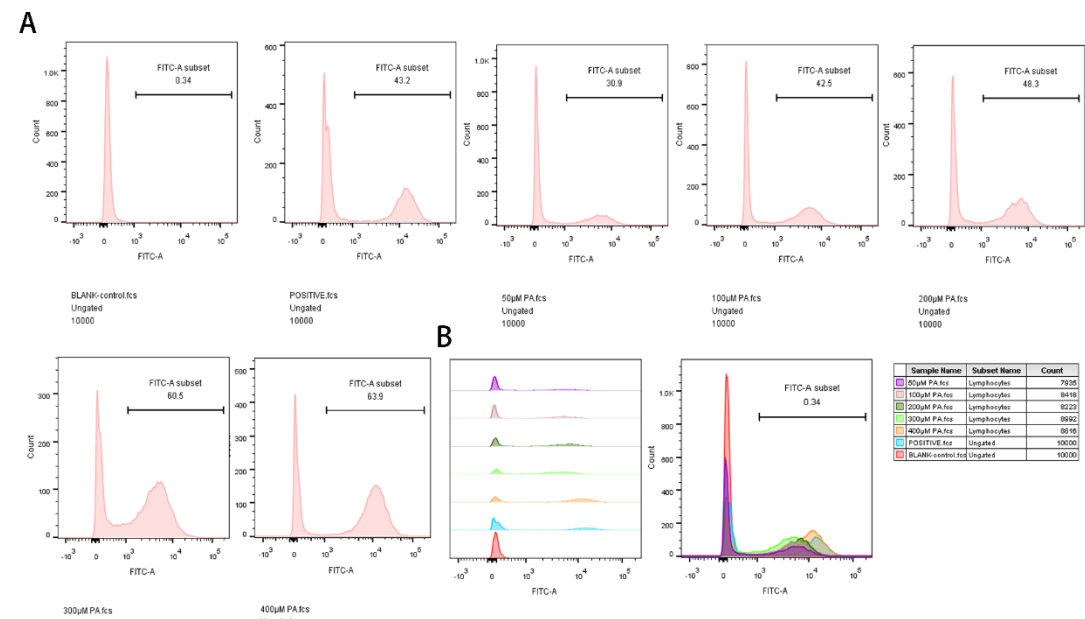
Supplementary Figure.1 A Myocardial Oil Red O Staining; B Myocardial Hematoxylin and Eosin Staining; C Myocardial Masson's Trichrome Staining. The Oil Red O staining result suggests that high-fat diet leads to significant lipid droplet accumulation in myocardial tissue. And the HE and Masson result indicates that a high-fat diet leads to structural disarray and cardiac fibrosis in myocardial tissue.



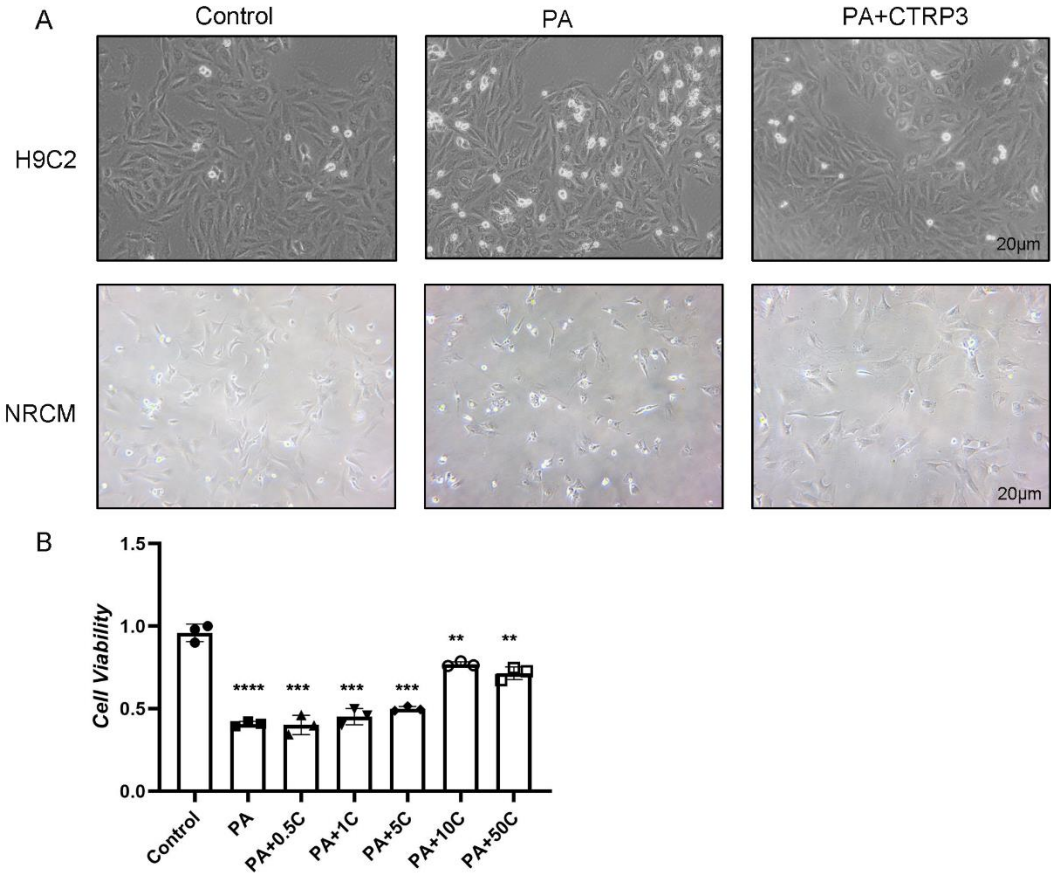
Supplementary Figure.2 A The damage of myocardial cells treated with different concentrations of PA. B The CCK8 results indicate that treating myocardial cells with PA for 24 hours leads to a gradual decrease in myocardial cell viability with increasing PA concentration. C CCK8 results suggest that treatment of myocardial cells with 50μm PA leads to a decrease in myocardial cell viability with increasing treatment time.



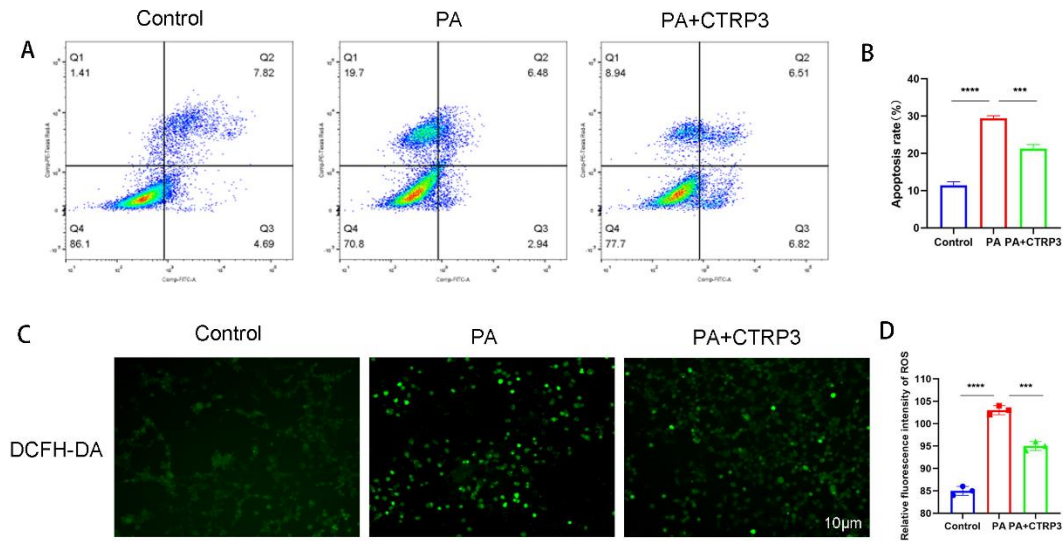
Supplementary Figure.3 A-B The flow cytometry results indicate that with the increase of PA concentration, the oxidative stress level in myocardial cells gradually rises.



Supplementary Figure.4 A After adding CTRP3 in H9C2 or NRCM myocardial cells, the viability and condition of myocardial cells significantly improved compared to the PA group. B Treating myocardial cells with 50μm PA for 24 hours, adding CTRP3 at different concentrations make improvement in myocardial cell viability.



Supplementary Figure.5 A-B Treatment of myocardial cells with 50μm PA for 24 hours, followed by the addition of 10μg/ml CTRP3, resulted in reduced apoptosis damage in myocardial cells compared to the PA group. C-D Treating myocardial cells with 50μm PA for 24 hours, followed by the addition of 10μg/ml CTRP3, resulted in a decrease in oxidative stress levels in myocardial cells compared to the PA group.



Supplementary Figure.6 A-B: PCR results indicate that CTRP3 can reduce the mRNA levels of the inflammatory factors IL1 β R1 and IL1 α in cardiomyocytes after PA treatment and in high-fat diet (HFD) conditions. C-D: ELISA results indicate that CTRP3 can reduce the levels of the inflammatory factors IL1 β R1 and IL1 α in the supernatant of cardiomyocytes after PA treatment and in serum after a high-fat diet.

