## Supplementary

**Table S1** The clinical information of PRKAG2 cardiac syndrome patients in a Chinese Han family

| Patient No. | Sex | Age at gene sequencing | Preexcitation | AV-block | Hypertrophy | Dose (mg) of metoprolol maintenance |
|---|---|---|---|---|---|---|
| II-3 | F | 73 | – | + | + | 47.5 |
| II-7 | M | 63 | – | + | + | 47.5 |
| II-9 | M | 57 | – | + | + | 47.5 |
| III-2 | F | 42 | – | + | + | 47.5 |
| III-7 | F | 34 | + | – | – | – |
| IV-1 | M | 23 | – | + | + | 47.5 |

F, female; M, male.

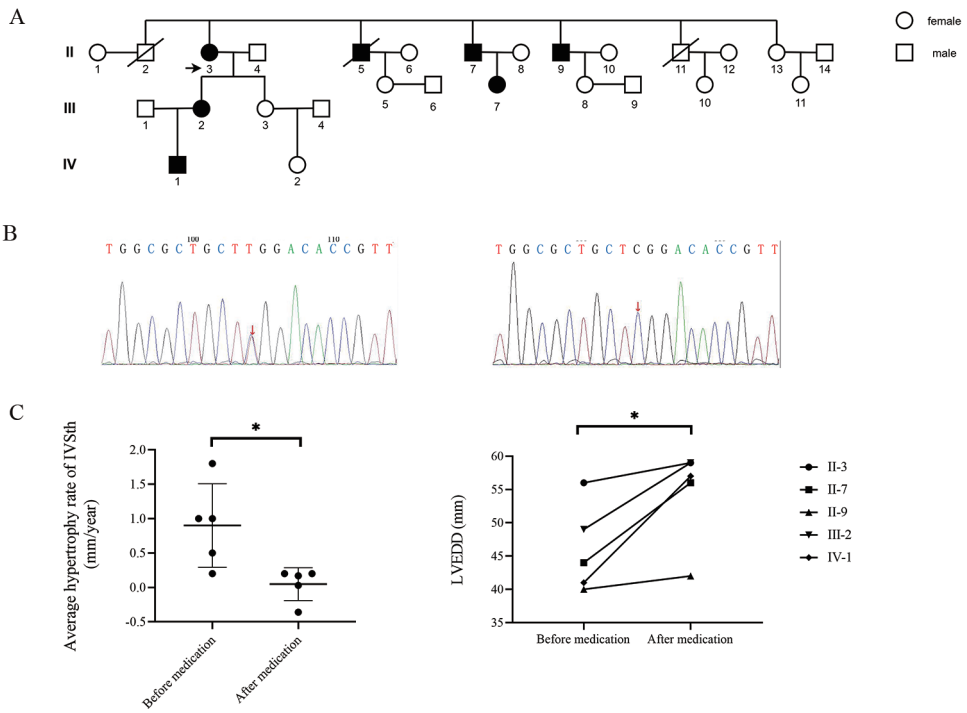


**Figure S1** β1-AR blocker metoprolol suppressed the cardiac hypertrophy in patients with *PRKAG2* cardiac syndrome. (A) The pedigree of a Chinese Han family. Squares and circles indicate males and females respectively. An arrow indicates the index patient. (B) Gene sequencing peak map showing the *PRKAG2* R302Q mutation. (C) Annual thickness change of the intraventricular septum in the 5 patients before and after treatment with metoprolol. Change of LVEDD in the 5 patients before and after treatment with metoprolol. Data are presented as the mean ± SD. *, P<0.05 (n=5). IVSth, thickness of the intraventricular septum; LVEDD, left ventricular end-diastolic dimension; β1-AR, β1-adrenergic receptor; SD, standard deviation.


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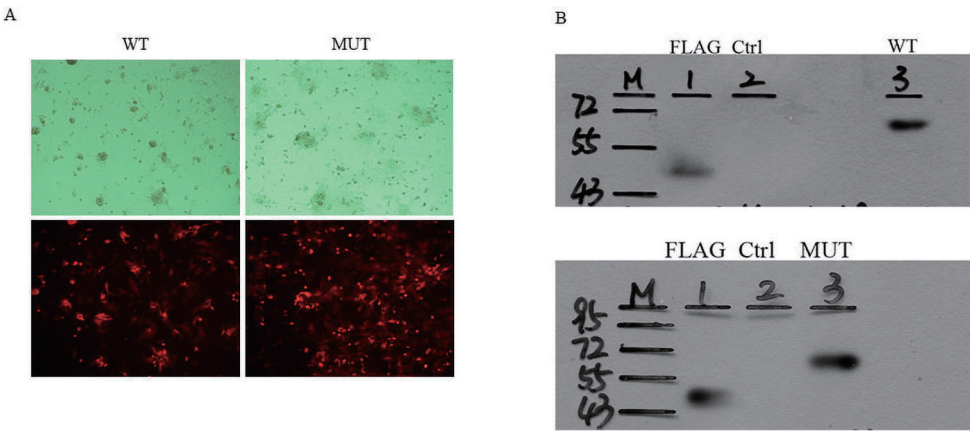


**Figure S2** Expression of red fluorescent protein and FLAG after transfection with wild-type and mutant viruses. (A) Red fluorescent expression after virus transfection. (B) Identification of viral FLAG tag protein expression, significantly higher in WT and MUT groups compared to FLAG protein standard group. M, marker; Ctrl, control; WT, wild type; MUT, mutant.

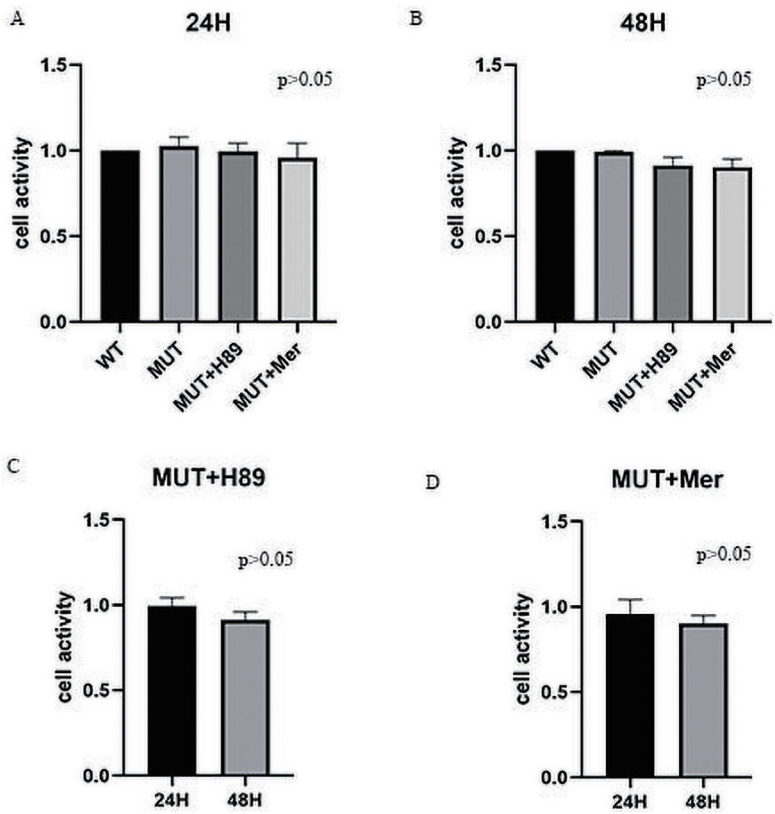


**Figure S3** Effect of H89 or metoprolol on cellular activity. (A) Changes in cell activity after 24 h of H89 or metoprolol intervention. (B) Changes in cell activity after H89 or metoprolol intervention for 48 h. (C) Changes in cell activity in the MUT group at 24 and 48 h after the addition of H89. (D) Changes in cell activity in the MUT group at 24 and 48 h after the addition of metoprolol. Data are presented as the mean ± SD (n=6). P>0.05. WT, wild type; MUT, mutant; Mer, metoprolol; SD, standard deviation.


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