CRF (Corticotropin Releasing Factor) system in human heart fetal development

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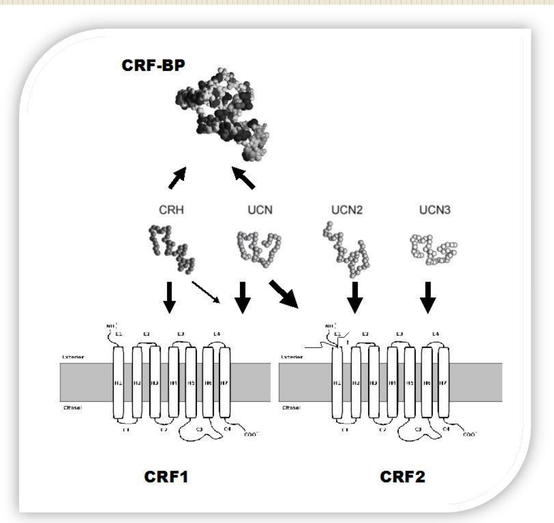
INTRODUCTION/ OBJECTIVE:

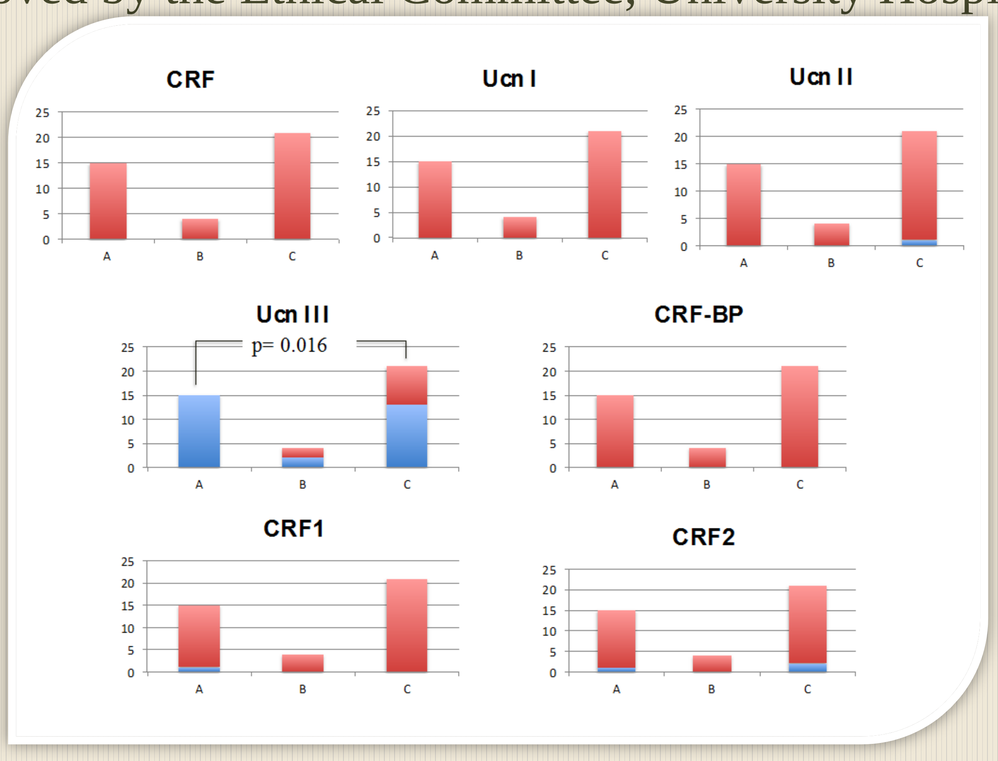
The CRF system of neuropeptides (CRF, Ucn I, II, III) and binding sites (CRF1, CRF2, CRF-BP) is responsible for stress regulation and homeostasis. Recent evidence from animal models involve CRF system in the developmental process of different fetal organs and in parturition. Aim of this study was to investigate the presence of CRF family members in human normal and pathological fetal heart.



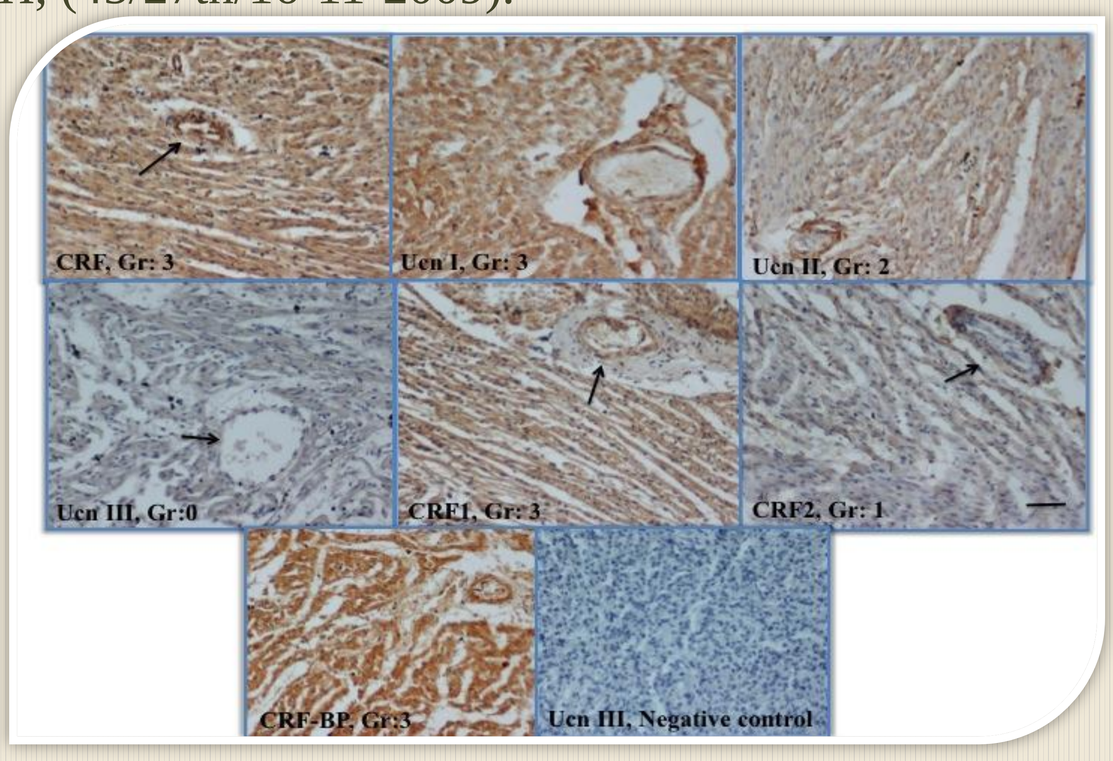
CRF system members

MATERIALS AND METHODS:

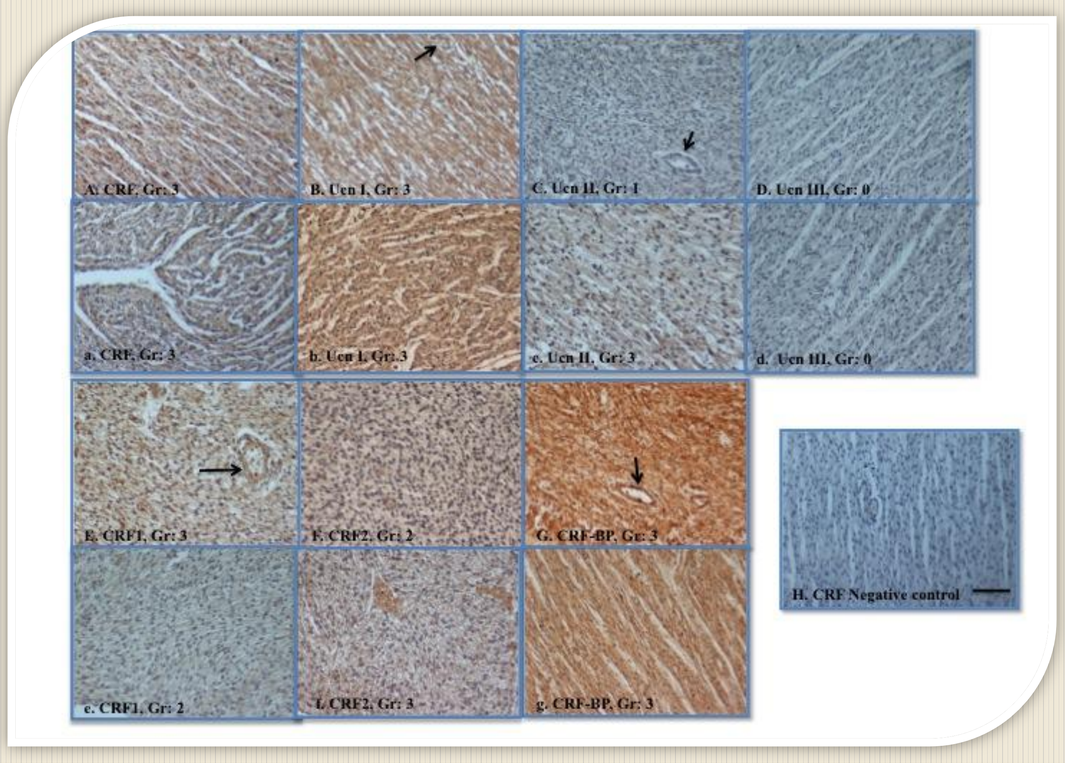
CRF system localization was investigated by immunohistochemistry in heart samples from 40 archival human fetuses of different gestational age, deriving from spontaneous abortions or elective therapeutic termination of pregnancy. Fetuses were divided, according to diagnosis, in Group A (no diagnosed pathology, 15 fetuses), Group B (with chromosomal abnormalities, 4 fetuses) and Group C (with congenital disorders, 21 fetuses) and, according to their mother's LMP, in trimesters of gestation. The protocol was approved by the Ethical Committee, University Hospital of DUTH, (45/27th/16-11-2009).



IHC detection of CRF system: accumulated data showing fractions of positively (red) and negatively (blue) stained fetal heart tissues. X axis: A: Group A (fetuses with no pathology), B: Group B (fetuses with chromosomal abnormalities), C: Group C (fetuses with congenital disorders). Y axis: Number of fetuses in every group. Statistically significant differences and *p values* can be seen.



IHC for CRF system in heart tissue of a fetus (female, 23 weeks), suffering from presence of interventricular foramen, right ventricular hypertrophy and aortic translocation astride the interventricular septum. The arrows show positive vessels. Gr: Grade of positivity. Original magnification: X200. Scale bar: 100 μm.



IHC for CRF system in human, fetal heart tissues. The arrows show positive vessels. A-G: normal fetuses from 2nd (B, C, E, F, G) and 3rd trimester (A, D) a-g: pathological fetuses (no heart pathology) from 1st (c), 2nd (a, b, e, f) and 3rd trimester (d, g). Gr: Grade of positivity. Original magnification: X200. Scale bar: 100 μm. H: negative control

RESULTS:

Immunoreactivity for all antigens was found throughout fetal growth and was cytoplasmic and membranic (neuropeptides, BP) or membranic (receptors). Ucn III was more frequently present before the 21st week (*p=0.021*) and in Group C than A (*p=0.016*).

CONCLUSION:

Both ligands and binding sites of the CRF system are present in the developing fetal heart and Ucn III seems to be correlated to early development and pathology. These results need further investigation, as Urocortins have also been involved in the adult heart pathophysiology and therapeutics.

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