EXPRESSION PROFILE AND TRANSCRIPTION FACTOR BINDING SITE EXPLORATION OF GENES IMPRINTED IN HUMAN AND MOUSE

BMC Genomics
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BACKGROUND

IMPRINTED GENES:

- Represent a minority of genes, which are transcribed from only one allele;
- Play a role in the regulation of embryonic growth;
- Control placental function;
- Modulate the transport of nutrients from mother to embryo;
- Control neurological development.

BACKGROUND

- Based on recent predictions, the number of mammalian imprinted genes may range between 100-600 genes.
- Imprinted genes are tightly regulated in a developmental and tissue specific manner
- The imprinted expression of genes appears to be a rather conserved phenomenon in mammals.
- Orthologous genes that are imprinted in human and mouse are most likely either maternally or paternally expressed.

BACKGROUND

Computational expression analysis of human and mouse imprinted genes to:

- Compared the profiles of individual genes across tissues;
- Analysed the corralations of expression patterns in human and mouse;
- Explored the role of preditted transcription factor binding sites

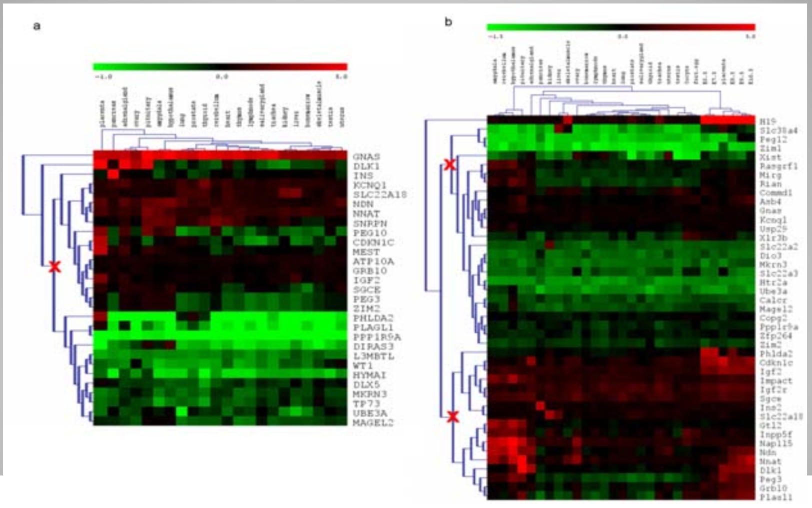
RESULTS

GENES SELECTED FOR ANALYSIS

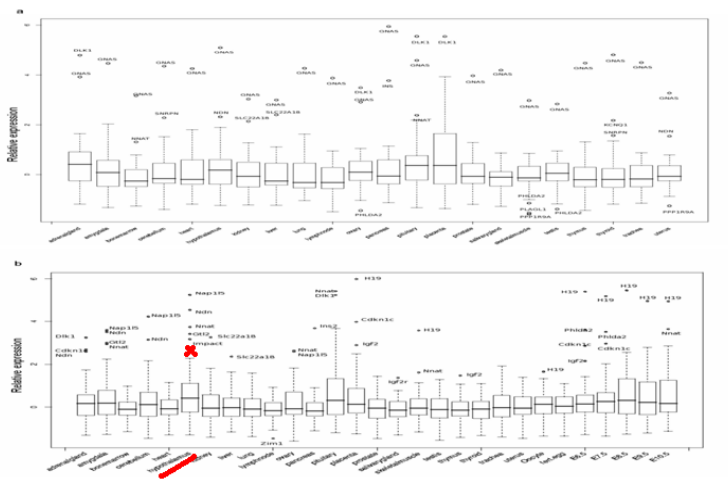
Information gathered from the IGC on 62 genes:

- For 30 genes imprinted status analysed in human and mouse → 26 imprinted in both species, 1 confirmed only in human and 3 only in mouse.
- For 23 genes imprinted status analysed in mouse.
- For 9 genes imprinted status analysed in human.

TISSUE-SPECIFIC EXPRESSION PATTERNS OF IMPRINTED GENES

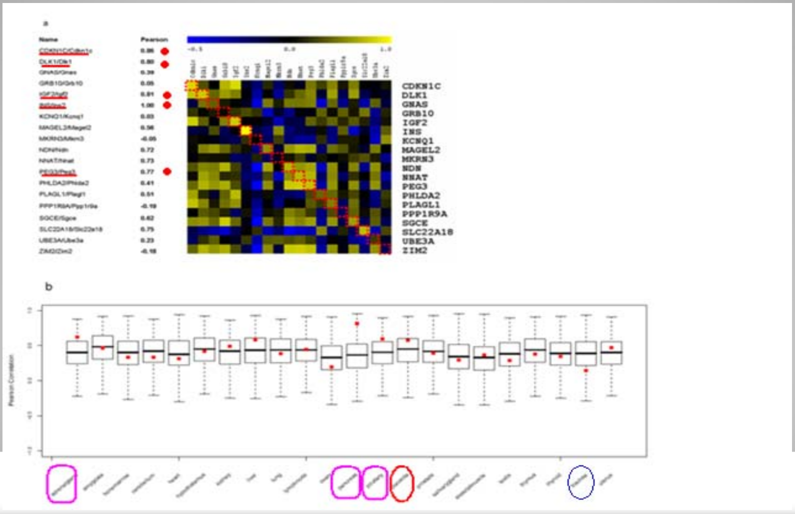


IMPRINTED GENES DO NOT SHOW PROMINENT OVEREXPRESSION IN DISTINCT TISSUES

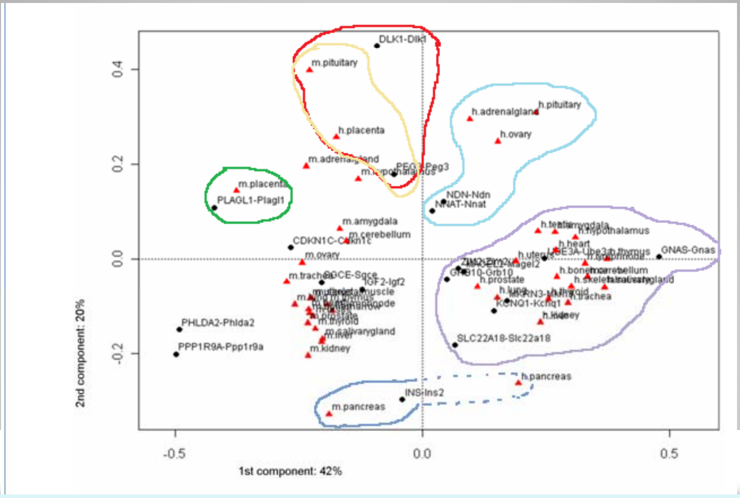


- Maternally and paternally imprinted genes do not cluster togheter.
- The parental origin of expression has no influence on tissue-specific expression profile.
- Paternally expressed genes tend to be more highly expressed than maternal genes.

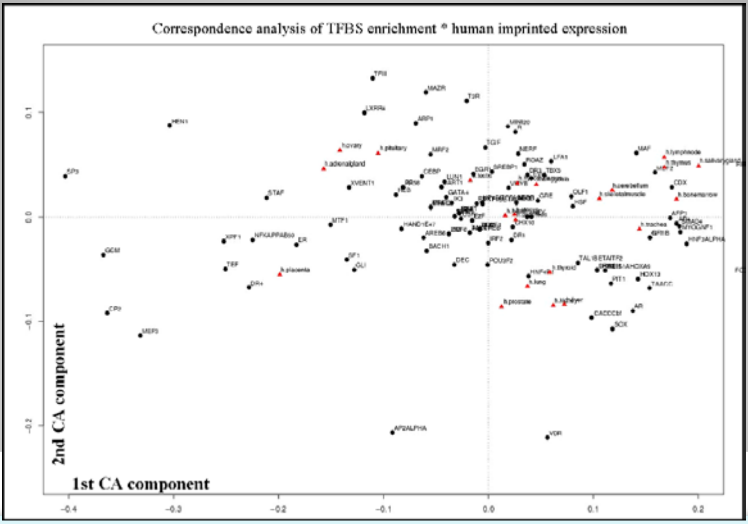
CORRELATION OF ORTHOLOGOUS GENE EXPRESSION IN HUMAN AND MOUSE

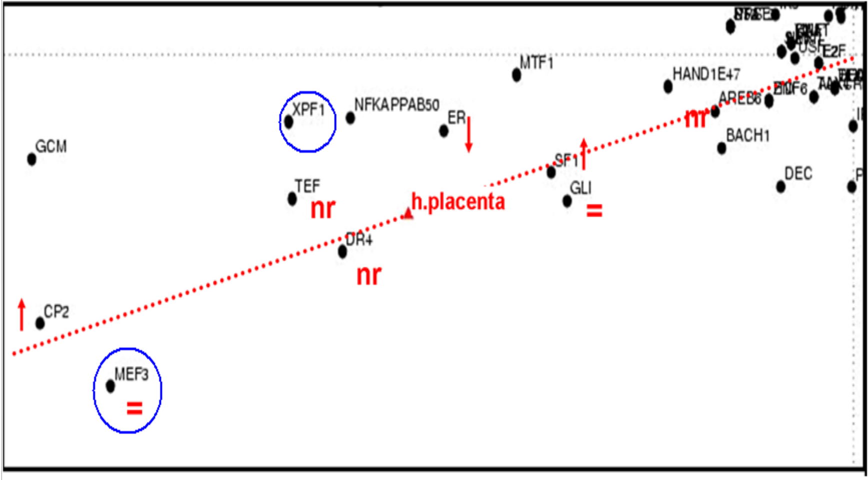


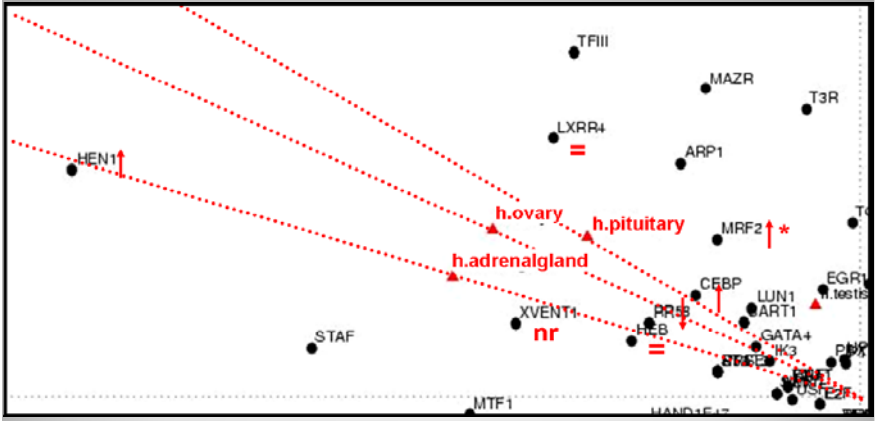
CORRESPONDENCE ANALISYS OF RELATIVE GENE EXPRESSION OF ORTHOLOGOUS IMPRINTED GENES



CORRESPONDENCE ANALISYS OF RELATIVE EXPRESSION AND TFBSs OF HUMAN ORTHOLOGOUS IMPRINTED GENES







DISCUSSION

- Imprinted genes are expressed in a broad range of adult tissues and placenta in human and mouse.
- Imprinted genes orthologues do not show a strong correlation of tissue-specific expression patterns in human and mouse.
- The correlation of expression patterns of imprinted genes in human and mouse is not pronounced and does not differ from that of randomly genes.

DISCUSSION

- Tissues with distinct expression profile are pituitary, adrenal gland, pancreas, placenta and ovary.
- Imprinted genes are strongly expressed in the pituitary, adrenal gland, pancreas and placenta.

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Role in the energy metabolism and homoestasis of mammals

DISCUSSION

- Pituitary, adrenal gland, placenta and ovary show a remarkable correlative association with distinct TFBSs in the promoter region of imprinted genes.