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Fanconi Anemia and Laron Syndrome

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Background Fanconi anemia (FA) is a condition characterized by genetic instability and short stature, which is due to growth hormone (GH) deficiency in most cases. However, no apparent relationships have been identified between FA complementation group genes and GH. In this study, we thereby considered an association between FA and Laron syndrome (LS) (insulin-like growth factor 1 [IGF-1] deficiency). Methods A 21-year-old female Mexican patient with a genetic diagnosis of FA was referred to our research department for an evaluation of her short stature. Upon admission to our facility, her phenotype led to a suspicion of LS; accordingly, serum levels of IGF-1 and IGF binding protein 3 were analyzed and a GH stimulation test was performed. In addition, we used a next-generation sequencing approach for a molecular evaluation of FA disease-causing mutations and genes involved in the GH-IGF signaling pathway. Results Tests revealed low levels of IGF-1 and IGF binding protein 3 that remained within normal ranges, as well as a lack of response to GH stimulation. Sequencing confirmed a defect in the GH receptor signaling pathway. Conclusions To the best of our knowledge, this study is the first to suggest an association between FA and LS. We propose that IGF-1 administration might improve some FA complications and functions based upon IGF-1 beneficial actions observed in animal, cell and indirect clinical models: erythropoiesis modulation, immune function improvement and metabolic regulation.

SciVal Topic Prominence
Topic: Fanconi Anemia | Fanconi Anemia Complementation Group Proteins | FA cells
Prominence percentile: 97.856

Author keywords
Developmental disorders; Endocrine disorders; Fanconi anemia; IGF-1; Laron syndrome

Indexed keywords

EMTREE drug terms:	Fanconi anemia group A protein; Fanconi anemia group G protein; Fanconi anemia group I protein; Fanconi anemia group L protein; genomic DNA; growth hormone; IGFBP3 protein; PALB2 protein; protein; somatomedin binding protein 3; somatomedin CSTAT5b protein; unclassified drug; growth hormone receptor; human growth hormone; IGF1 protein, human; IGFBP3 protein, human; somatomedin binding protein 3; somatomedin C
EMTREE medical terms:	Adult; Article; biochemical analysis; case report; clinical feature; disease association; Fanconi anemia; female; genetic variation; heterozygote; hospital admission; human; Laron syndrome; missense mutation; molecular diagnosis; molecular pathology; next generation sequencing; physical examination; protein analysis; protein blood level; provocation

	testshort stature; signal transduction; tooth development; young adult; blood; body height; complication; Fanconi anemia; genetics; Laron syndrome; metabolism; Mexico; pathology
MeSH:	Body Height; Fanconi Anemia; Female; Human Growth Hormone; Humans; Insulin-Like Growth Factor Binding Protein 3; Insulin-Like Growth Factor I; Laron Syndrome; Mexico; Receptors, Somatotropin; Signal Transduction; Young Adult

Chemicals and CAS Registry Numbers:
growth hormone, 36992-73-1, 37267-05-3, 66419-50-9, 9002-72-6; protein, 67254-75-5; somatomedin C, 67763-96-6; human growth hormone, 12629-01-5;

Human Growth Hormone; IGF1 protein, human; IGFBP3 protein, human; Insulin-Like Growth Factor Binding Protein 3; Insulin-Like Growth Factor I; Receptors, Somatotropin

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