Abstract

Clin Endocrinol Metab. 2014 Jun 17. [Epub ahead of print]

Testicular synthesis and vitamin D action.


Division of Endocrinology and Metabolism, Department of Internal Medicine, Medical University of Graz, Graz, Austria;

CONTEXT: The vitamin D system has pleiotropic effects not only in bone metabolism. Its role in testicular steroidogenesis is new and deserves intensive research.

OBJECTIVE: We hypothesize that vitamin D, especially 1,25(OH)2D3 (calcitriol) induces male steroidogenesis and intend to identify its impact on genes and pathways in testicular androgen regulation.

METHODS: Human adult primary testicular cells were isolated, treated with 1,25(OH)2D3 and their gene expression levels profiled by microarray analysis. Highly regulated genes were confirmed by real time quantitative PCR (RT qPCR). In addition, effects of 1,25(OH)2D3 in combination with luteinizing hormone (LH) and insulin-like growth factor 1 (IGF-1) on gene expression level of androgens were assessed. Testosterone levels in the culture media were determined by high-resolution ELISA. The expression of vitamin D receptor (VDR) was confirmed at baseline and after 1,25(OH)2D3 stimulation using immunocytochemistry.

RESULTS: Microarrays depicted sixty-three genes significantly regulated by 1,25(OH)2D3, including genes related to male androgen and vitamin D metabolism, mainly triggered by VDR/RXR receptor activation. 1,25(OH)2D3 led to significant changes in the expression profiles of reproductive genes and significantly increased testosterone synthesis in human testicular cell cultures.

CONCLUSIONS: Data from our human primary testicular cell culture model suggest that vitamin D plays a major role in male steroidogenesis in vitro.

PMID: 24937537