

Vitamine D: regulatie van genen

De laatste jaren zijn echter steeds meer functies van het D-hormoon aangetoond, die niet gerelateerd zijn aan de calciumhuishouding. In studies is aangetoond, dat er in het cytoplasma en de kernen van hersen-, pancreas-, huid-, kraakbeen-, bijnier-, borstklier-, amnion-, spier-, parathyroïdklier- en immuuncellen 1,25(OH)₂D₃-receptoren aanwezig zijn. Het D-hormoon zou onder meer een rol spelen in de productie van insuline, prolactine, de spierfunctie, de immuun- en stress-respons, de melaninesynthese en de differentiatie van huid- en bloedcellen.

In de tabel staat weergegeven van welke genen het D-hormoon de expressie/activiteit kunnen reguleren.

Gene product	Tissue in which regulation has been demonstrated	Gene product	Tissue in which regulation has been demonstrated
Upregulated			
Aldolase subunit B	Chick kidney	1-OH-D ₃ 24-hydroxylase	Rat kidney
Alkaline phosphatase	Chick, rat intestine	1,25-(OH) ₂ -D ₃ receptor	Mouse fibroblasts
ATP synthase	Chick intestine; rat intestine	Plasma membrane Ca ²⁺ pump	Chick intestine
Calbindin-D _{9kDa}	Chick kidney, skin, bone; rat intestine, skin bone	Prolactin	Rat pituitary
Calbindin-D _{28kDa}	Chick brain, kidney, uterus, intestine; mouse kidney; rat kidney, brain	Protein kinase C	HL-60 cells
Carbonic anhydrase	Marrow; myelomonocytes	Tumor necrosis factor α	U937, HL-60 cells
Cytochrome <i>c</i> oxidase		Vitamin D receptor	Rat intestine, pituitary
Subunit I	Chick intestine; rat intestine	Downregulated	
Subunit II	Chick intestine; rat intestine	ATP synthase	
Subunit III	Chick intestine; rat intestine	Calcitonin	Chick kidney
Fibronectin	MG-63, TE-85, HL-60 cells	CD23	Rat thyroid gland
c-Fms	HL-60 cells	Collagen, type I	PBMCs
c-Fos	HL-60 cells	Cytochrome <i>b</i>	Rat fetal calvaria
Glyceraldehyde-3-phosphate dehydrogenase	BT-20 cells	Cytochrome <i>c</i> oxidase	Chick kidney
Heat shock protein 70	PBMCs	Subunit I	
Integrin _{α₇β₃}	Chick osteoclasts	Subunit II	Chick kidney
Interleukin 1	U937 cells	Subunit III	Chick kidney
Interleukin 6	MC3T3 cells	Fatty acid-binding protein	Chick kidney
Interleukin 3 receptor	BALB-3T3 cells	Ferridoxin	Chick intestine
c-Ki-Ros	UMR106-01, ROS cells	Granulocyte-macrophage colony-stimulating factor	Chick kidney
Matrix Gla Protein	Rat keratinocytes	Histone H ₄	Human T lymphocytes
Metallothionein	MG-63 cells	Interferon γ	HL-60 cells
c-Myc		Interleukin 2	Human T lymphocytes
NADH dehydrogenase subunit III	Chick intestine	c-Myb	Human T lymphocytes
Nerve growth factor	L-929 cells	c-Myc	HL-60 cells
Neutrophil-activating polypeptide	HL-60 cells	NADH dehydrogenase subunit I	HL-60, U937 cells
Osteocalcin	ROS cells	Prepro-PTH	Chick kidney
Osteopontin	ROS cells	Protein kinase inhibitor	Rat, bovine parathyroid
		PTH	Chick kidney
		PTH-related protein	Rat parathyroid
		Transferrin receptor	T lymphocytes
		α-Tubulin	PBMCs
			Chick intestine

Abbreviations: PTH, parathyroid hormone; PBMCs peripheral blood mononuclear cells.