

TCF7L2 GENETIC VARIANT (TYPE II DIABETES RISK)

ORDERING INFORMATION

REF: GEN-050-25
Tests: 25 Reactions: 31
Manufacturer: BioMol Laboratories s.r.l.

CONTENTS OF THE KIT

The kit consists of reagents for Real-Time PCR amplification
*Reagents for the extraction of genomic DNA are not supplied in the kit



PRODUCT CHARACTERISTICS

Device belonging to the family of in vitro devices **REAL-TIME QUALITATIVE PCR-GENETIC VARIANTS- RESEARCH USE ONLY**. Detection of the polymorphisms rs7903146 (C>T) of the transcription factor 7-like 2 (TCF7L2) by Real-Time PCR technique. Kit optimized for Real-time PCR instruments Biorad CFX96 Dx, Biorad Opus Dx, Agilent AriaDx, Thermofisher QuantStudio™ 5 Real-Time PCR System.

SCIENTIFIC BACKGROUND

In humans, TCF7L2 is located on chromosome 10q25.2-q25.3; it spans over 217,432 bp of DNA and consists of 17 exons. The full-length TCF7L2 protein contains 596 amino-acid residues in a certain subsequence of the N terminal, β catenin-binding domain, Groucho-binding sequence, HMG box-DNA-binding domain (HGM-DBD), cysteine clamp (C clamp), and C terminal. TCF7L2 operates as a transcription factor with β -catenin, regulating WNT-signalling target genes involved in cell differentiation, including pancreatic β -cell as well as α -cell development and function.

Type 2 diabetes is a multifactorial disease and a leading cause of death and disability worldwide. Susceptibility to type 2 diabetes is influenced by genetic predispositions, an adverse foetal environment, as well as with time- and age-dependent lifestyle behaviours (e.g., unhealthy diet, physical inactivity) leading to excess body weight gain, eventually precipitating overt type 2 diabetes.

Genome-wide association studies have identified over 1200 type 2 diabetes risk association signals.

§ Impact of TCF7L2 rs7903146 on clinical presentation and risk of complications in patients with type 2 diabetes. Diabetes Obes Metab. 2025;1-10.

§ CC Genotype at TCF7L2 Diabetes Risk Locus rs7903146 Directs a Coordinated Fatty Acid Response to a Mediterranean Diet Intervention: A Randomized Controlled Trial. Lifestyle Genomics 2025;18:36-51.

§ Significant Association of Polymorphisms in the TCF7L2 Gene with a Higher Risk of Type2Diabetes in a Moroccan Population. J. Pers. Med. 2021, 11(6), 461.

§ TCF7L2 Genetic Variants Contributed to Phenotypic Heterogeneity of Type 1 Diabetes. Diabetes Care 2018;41:311-317.

§ Meta-Analysis BMC Med Genet. 2018 Mar 7;19(1):38. doi: 10.1186/s12881-018-0553-5. Meta-analysis of association between TCF7L2 polymorphism rs7903146 and type 2 diabetes mellitus

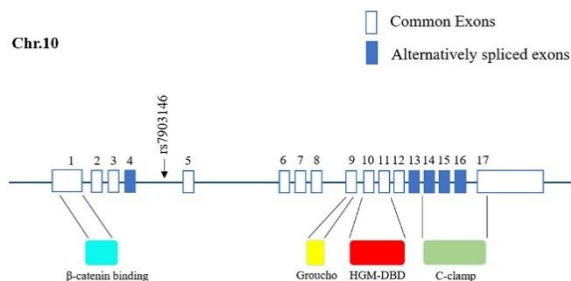
§ Multicenter Study Diabetes. 2008 Jan;57(1):244-54. doi: 10.2337/db07-0615. Epub 2007 Oct 31. Impact of common type 2 diabetes risk polymorphisms in the DESIR prospective study

CLINICAL SIGNIFICANCE

DESIR Prospective Study: rs7903146 (C/T) is a common variant in the transcription factor 7-like 2 (TCF7L2) gene, with the T-allele identified as the risk allele for type 2 diabetes.

The TCF7L2 rs7903146 CT/TT genotypes strongly predicted future type-2 diabetes. The risk T allele was associated with impaired insulin secretion, incretin effects, and enhanced rate of hepatic glucose production. TCF7L2 expression in human islets was increased 5-fold in T2D, particularly in carriers of the TT genotype.

Therefore, a single high-impact diabetes risk variant can influence several key clinical characteristics in patients with diagnosed type 2 diabetes, and most importantly a hitherto unrecognized relatively lower risk of macrovascular complications up to 10 years after the diagnosis of type 2 diabetes.





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DESCRIPTION	LABEL	VOLUME	STORAGE
		GEN-050-25	
Mix oligonucleotides and probes	Mix TCF7L2 10X	1 x 62 µl	-20°C
Mix buffer and Taq polymerase enzyme	Mix Real-Time PCR 5X	1 x 124 µl	-20°C
Deionized H ₂ O	Deionized H ₂ O	1 x 1 ml	-20°C
Genomic DNA or recombinant DNA	Control 1	1 x 22 µl	-20°C
Genomic DNA or recombinant DNA	Control 2	1 x 22 µl	-20°C
Genomic DNA or recombinant DNA	Control 3	1 x 22 µl	-20°C

TECHNICAL CHARACTERISTICS

COD. GEN-050-25

STABILITY	18 months
REAGENTS STATUS	Ready to use
BIOLOGICAL MATRIX	Genomic DNA extracted from whole blood, tissues, cells
CONTROLS	Recombinant DNA for at least 3 analytical sessions
VALIDATED INSTRUMENTS	Biorad CFX96 Dx, Biorad Opus Dx and Agilent AriaDx, Thermofisher QuantStudio™ 5 Real-Time PCR System.
TECHNOLOGY	Real-time PCR; oligonucleotides and specific probes; 2 FAM/HEX fluorescence channels
RUNNING TIME	85 min
THERMAL CYCLING PROFILE	1 cycle at 95 °C (10 min); 45 cycles at 95 °C (15 sec) + 64 °C (60 sec)
ANALYTICAL SPECIFICITY	Absence of non-specific pairings oligonucleotides and probes; absence of cross-reactivity
LIMIT OF DETECTION (LOD)	≥ 5 ng of genomic DNA
LIMIT OF BLANK (LOB)	>40 Cq
REPRODUCIBILITY	99,9%
SPECIFICITY / SENSITIVITY	99,9%/98%