

# GDF-15 (Total and H-Specific)

Enzyme-Linked Immunoassay Kit



## Introduction:

Growth Differentiation Factor 15 (GDF-15, also called as MIC-1, NAG-1 and NRG-1, Uniprot: Q99988) is a divergent member of the TGF- $\beta$  superfamily of growth factors. It is encoded in humans by a gene in chromosome 19. The human GDF-15 gene encodes for a protein of 308 amino acid residues which consists of a signal sequence (residues 1-29), a pro-domain (30-194) and a mature growth-factor domain (195-308). The protein is secreted from the producing cell and the precursor containing the pro and mature domains is proteolytically processed by furin-like protease, typically in the Golgi complex, but sometimes also an unprocessed protein is secreted. Two mature domains dimerize forming a typical TGF- $\beta$ -like structure with four  $\beta$ -strands and an  $\alpha$ -helix in each protomer, with an interfacial disulfide stabilizing the mature growth factor. The molecular weight of a mature GDF-15 dimer is 25 kDa.

Mature GDF-15 has its dedicated GFRAL transmembrane receptor which is found only in very restricted area in the hindbrain. GFRAL facilitates GDF-15 signaling through Ret receptor tyrosine kinase, similar to GDNF subfamily of growth factors.

Approximately 25% of humans have a missense polymorphism in GDF-15 gene resulting in mutation of histidine 202 to aspartate (H202D; histidine 6 in the mature domain), close to the N-terminus of the mature growth factor. This variant is associated with phenotypes in prostate cancer, hyperemesis gravidarum (severe morning sickness in pregnancy) and rheumatoid arthritis. The underlying mechanism and significance of these associations is still unclear though.

GDF-15 expression in healthy subjects is most abundant in placenta, followed by the prostate and very low levels in the bladder, kidney, colon, stomach, liver, gall bladder, pancreas, and endometrium<sup>1-3</sup>. GDF-15 is expressed by cardiomyocytes, adipocytes, macrophages, endothelial and vascular smooth muscle cells<sup>4</sup>. High circulating GDF-15 concentration are in general related to inflammation, myocardial ischemia, and cancer except for in pregnancies. It is often induced under stress to maintain cell and tissue homeostasis<sup>5-6</sup>.

GDF-15 is proposed as a diagnostic biomarker in colorectal<sup>7-8</sup>, ovarian<sup>9</sup>, early-stage lung cancer<sup>8-10</sup>. It is shown to be an accurate marker for differentiating pancreatic adenocarcinoma and chronic pancreatitis<sup>11</sup>. It has also shown to be a potential biomarker to aid in the discrimination between prostate cancer and benign hyperplasia<sup>12-14</sup>, studied as a biomarker for disease prognosis and as an emerging target for cancer immunotherapy<sup>15</sup>. Neutralizing antibodies against GDF-15 has been studied to revert the weight loss in animal models of cancer-related cachexia<sup>15-17</sup>.

## ANSH LABS ADVANTAGES

### Specific

The Total GDF-15 ELISA assay when tested on synthetic dimers of human GDF-15 homozygote for wild type (HH), heterozygote HD and the homozygous mutation (DD) detects all forms almost equally. A combination of Ansh Labs AL-1014-r ( Total GDF-15 assay) and AL-1018-r (GDF-15 (H-specific) assay) can help estimate the mutant (DD) concentration in serum as the AL-1018-r does not detect DD variant.

#### Total GDF-15:

Total GDF-15	Expected GDF-15 Conc (pg/mL)	Observed GDF-15 Conc (pg/mL)	% Recovery	% Average Recovery
HH/Wild Type	500	529.9	106.0	99.5%
	50	46.5	93.1	
HD, DH, HH, and DD / Hetero dimer	500	616.6	123.3	115.5%
	50	53.9	107.7	
DD/H202D homozygous variant	500	540.0	108.0	96.4%
	50	42.4	84.8	

- Two assays, Total and H-specific GDF-15, allow for comprehensive testing to estimate the variant (H202D) concentration in serum.
- Simple three-step procedure with approximate 1.5 hour incubation at room temperature.
- Can be used with maternal serum and urine as well as male serum samples. Dilutions on maternal samples are required.
- Total GDF-15 assay is sensitive to 2.2 pg/mL with an analytical measurable range of 15-2906 pg/mL. The H-specific assay is sensitive to 2.4 pg/mL with an analytical measurable range of 13-3022 pg/mL.

#### H-Specific GDF-15:

H-Specific GDF-15	Expected GDF-15 Conc (pg/mL)	Observed GDF-15 Conc (pg/mL)	% Recovery	% Average Recovery
HH/Wild Type	500	491.2	98.2	98.2%
HD, DH, HH, and DD / Hetero dimer	500	154.3	30.9	30.9%
DD/H202D homozygous variant	500	<31.1	ND	ND

# GDF 15

# Product Listing

## GDF-15 is a useful research tool for studies related to:

- Obesity / Diabetes
- Cancer
- Possible target for cancer immunotherapy
- Discriminate prostate cancer from benign hyperplasia
- Differentiating pancreatic adenocarcinoma and chronic pancreatitis

## ELISA 96 Wells

### GDF-15 (Total)

Method	Quantitative 3-step sandwich type immunoassay
Incubation Time	Total 2 hour incubation at room temperature
Approximate Dynamic Range	7 points, 15-2906 pg/mL
Sensitivity	2.2 pg/mL
Sample Size / Type	5 $\mu$ L / Serum <b>OR</b> 2 $\mu$ L / Urine (both pre-dilution)
Shelf-life	24 months
Catalog Number	AL-1014

### GDF-15 (H-Specific)

Method	Quantitative 3-step sandwich type immunoassay
Incubation Time	Total 2 hour incubation at room temperature
Approximate Dynamic Range	7 points, 13.3-3022 pg/mL
Sensitivity	2.4 pg/mL
Sample Size / Type	5 $\mu$ L / Serum <b>OR</b> 2 $\mu$ L / Urine (both pre-dilution)
Shelf-life	24 months
Catalog Number	AL-1018

## Related Assays

Glucagon	96-Well ELISA	AL-157 [FDA, CE]
C-Peptide of Insulin	96-Well ELISA	AL-151
Glicentin	96-Well ELISA	AL-185
GLP-1	96-Well ELISA	AL-172
GLP-2	96-Well ELISA	AL-174
Oxyntomodulin	96-Well ELISA	AL-139
Proglucagon	96-Well ELISA	AL-1019

\*Unless otherwise stated here, in our catalog, or other product documentation, these kits are intended for research use only and not for in vitro diagnostic purposes or therapeutic uses.  
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### Reproductive Function

- Activin A [CE]
- Activin B
- Activin AB
- AFP
- AMH [CE]
- AMH, Dried Blood Spot [CE]
- AMH (PCOCheck™) [CE]
- picoAMH (MenoCheck®) [FDA, CE]
- BMP-15
- Estriol [FDA, CE]
- Follistatin
- Follistatin Like-3 (FSTL-3)
- FSH [FDA]
- FSH, Dried Blood Spot
- GDF-9
- GDF-9/BMP-15 Complex
- GDF-15 (Total)
- GDF-15 (H-Specific)
- Inhibin, Total
- Inhibin A [FDA, CE]
- picoInhibin A
- Inhibin A (OMQCheck™)
- Inhibin B [CE]
- Inhibin B, Ultra-Sensitive [CE]
- LH [FDA]
- LH, Dried Blood Spot
- PAPP-A2 [CE]
- picoPAPP-A [CE]
- PLGF [CE]
- Prolactin [FDA, CE]
- Prolactin, Dried Blood Spot [CE]
- Testosterone

### Metabolism

- C-Peptide of Insulin
- Glicentin
- GLP-1
- GLP-2
- Glucagon [FDA, CE]
- Major Proglucagon Fragment (MPGF)
- Oxyntomodulin
- Proglucagon

### Growth Factors

- IGF-I, Free
- IGF-I, Total [FDA, CE]
- IGF-II
- IGFBP-2
- IGFBP-3, Intact
- IGFBP-3, Total
- IGFBP-4, Intact
- IGFBP-4, Total
- IGFBP-5
- picoIL-6
- Stanniocalcin 2

### Species Specific Assays

- Activin B - Mouse
- AMH - Bovine, Canine, Equine, Mouse, Ovine, Porcine, Rat
- IGF-I, Free - Mouse, Rat
- IGF-I, Total - Mouse, Rat
- Inhibin A - Canine, Equine, Rodent
- Inhibin B - Canine, Equine, Rodent
- Oxyntomodulin - Mouse, Rat
- PAPP-A - Mouse

### Specialty Controls

- AnshCheck AMH Tri-Level Controls [FDA, CE]
- AnshCheck Inhibin B Tri-Level Controls
- AnshCheck Maternal Screening Bi-Level Controls [FDA, CE]

### Neuronal Disorders

- MBP

\*\*Unless stated otherwise, products are for research use only.

### Customer Relations

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