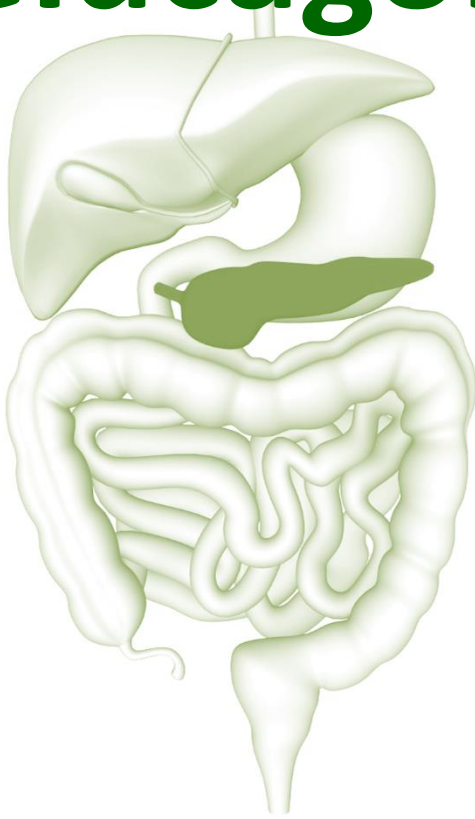


This product is not intended for diagnostic or medical purposes.

Glucagon



Glucagon is a **peptide hormone** with a molecular weight of 3,485 consisting of 29 amino acid residues, secreted by pancreatic **alpha** cells.

It acts on the liver to promote the production and release of glucose through glycogenolysis and glycogenesis, thereby **elevating blood glucose**.

Antibody

[#10505 Anti-Glucagon \(52A1A\) Rat IgG MoAb](#)

- Application : IHC
- Package size : 5µg, 50µg
- Species : Human

ELISA

[#27797-96Well Glucagon ELISA Kit – IBL](#)

- Sample : EDTA plasma
- Measurement range : 0.31 ~ 20 pmol/L
- Dilution ratio : x2
- Sensitivity : 0.05 pmol/L

Diabetes and Glucagon

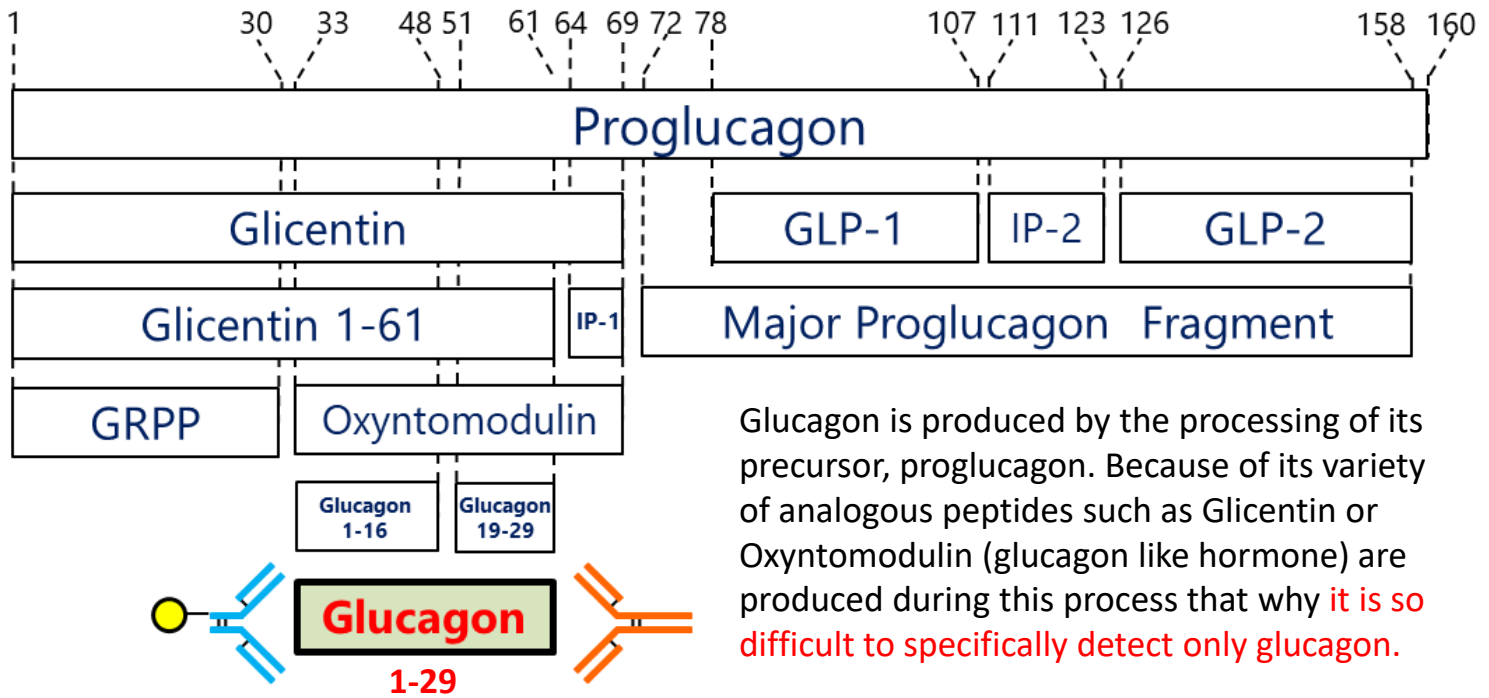
Type 2 diabetes, which is said to account for **95%** of all diabetics, is caused by decreased insulin secretion and insulin resistance. **Insulin** is a hormone secreted by the beta cells of the pancreas, which **lowers blood glucose levels** by drawing sugar from the blood into the body. On the other hand, glucagon is a hormone secreted from the alpha cells of the same pancreas and **increases blood glucose levels** by increasing the production of sugar in the liver. Insulin and glucagon are considered "**antagonistic hormones**" because they maintain constant blood glucose levels by balancing each other.

Working for Blood Glucose Level	Insulin	Glucagon
	↓ Making Down	↑ Making Up
Diabetes		
	Insulin	Glucagon
	↓ Down	↑ Up

However, papers published in 2010 and 2011 suggested that the presence of a certain amount of glucagon, rather than the presence or absence of insulin, may contribute to elevated blood glucose levels, and the "**glucagon-centric theory**"¹⁾ was published in 2012 by Unger, Cherrington, and colleagues.

Issue of Glucagon measurement

It is 100 year anniversary of Glucagon in 2023 since it was discovered, however, Glucagon has not been well clinically studied in past century because of the **lack of availability for reliable assays in the market**. It is quite difficult for specifically detecting only Glucagon (1-29) because of the producing process of Glucagon.



ELISA

[#27797-96Well Glucagon ELISA Kit – IBL](#)

Highly Specificity

IBL has successfully developed a **highly sensitive** and **specific** ELISA using novel N- and C-terminal specific paired antibodies.

It is very important for detecting specific Glucagon (1-29) because it has been reported that some diabetic patients with impaired glucose tolerance have high levels of glicentin (one of glucagon-like hormone) in their blood.

Peptide	Cross reactivity
Glucagon(3-29)	N.D
Oxyntomodulin	0.06%
Glicentin(1-61)	0.05%
Glicentin(1-69)	N.D
Glucagon (19-29)	N.D
GLP-1(7-36)amide	0.02%
GLP-1(9-36)amide	0.01%
GLP-2	<0.01%
GIP(1-42)	<0.01%
GIP(3-42)	<0.01%

Assume 100% reaction with glucagon (1-29)

References

[Kobayashi M, Maruyama N, Yamamoto Y, Togawa T, Ida T, Yoshida M, Miyazato M, Kitada M, Hayashi Y, Kashiwagi A, Kitamura T. A newly developed glucagon sandwich ELISA is useful for more accurate glucagon evaluation than the currently used sandwich ELISA in subjects with elevated plasma proglucagon-derived peptide levels. J Diabetes Investig. 2023 Feb 2. doi: 10.1111/jdi.13986. Epub ahead of print. PMID: 36729958.](#)

Highly Sensitive

To determine its physiological functions, the hemodynamics of glucagon is required to be analyzed using a variety of loading tests and it has been known that Glucagon blood level is greatly decreased in OGTT (Oral Glucose Tolerance Test). The value might be decreased the point of a few pmol/L level so that the sensitivity is also very important for accurately measuring of glucagon as well as specificity. To fulfill this needs, high specificity and sensitivity are required for the kit development. The kit is **highly sensitive** enough to measure even low-concentration samples after glucose loading.

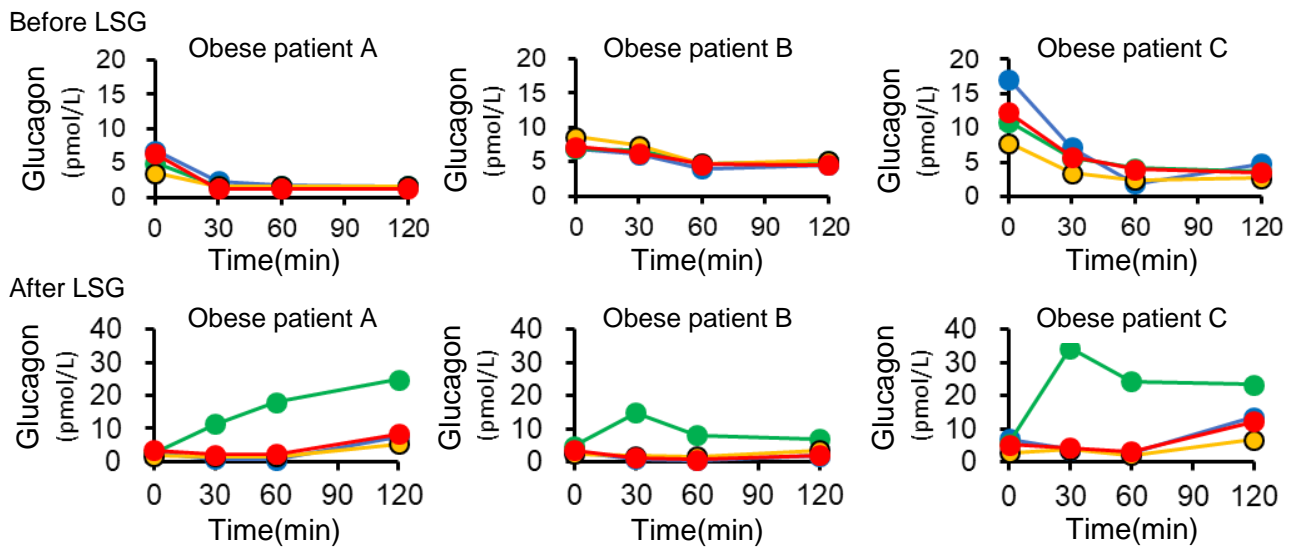
■ Lower limit of quantification (LLOQ)

Measurement method	(pmol/L)
New IBL ELISA	0.63
Currently available ELISA (RUO)	1.57 *
Currently available ELISA (IVD)	1.57 *
LC-HRMS	0.5

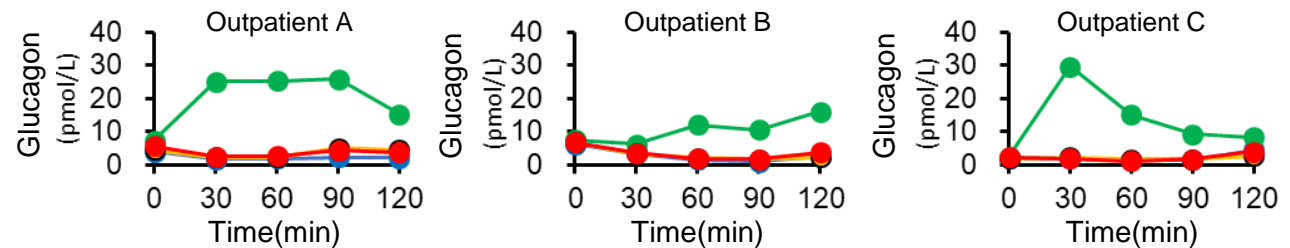
* The value on the IFU (Other makers). Measured using by sequential protocols.

■ Cases with high value of proglucagon-derived peptide

(1) Obese patients with Laparoscopic Sleeve Gastrectomy (LSG)



(2) Outpatients with suspected glucose intolerance



● New IBL ELISA ● LC-HRMS ● Currently available ELISA (RUO) ● Currently available ELISA (IVD)

Increased samples detected under LLOQ

There are samples with falsely elevated glucagon after glucose loading.

■ Measurement of plasma glucagon levels in low concentration range

Measurement method		New IBL ELISA	Currently available ELISA (RUO)	Currently available ELISA (IVD)
LLOQ (pmol/L)		0.63	1.57	1.57
LLOQ samples / Measured samples (percentage)	Obese patients	BF LSG	1 / 92 (1.1 %)	15 / 92 (16.3 %)
		AF LSG	4 / 92 (4.3 %)	3 / 92 (3.3 %)
	Outpatients	10 / 360 (2.8 %)	102 / 360 (28.3 %)	14 / 360 (3.9 %)

The New IBL ELISA can measure glucagon in the low-concentration range, and much reliable data can be obtained even if tests were conducted after OGTT which makes suppression of glucagon secretion.

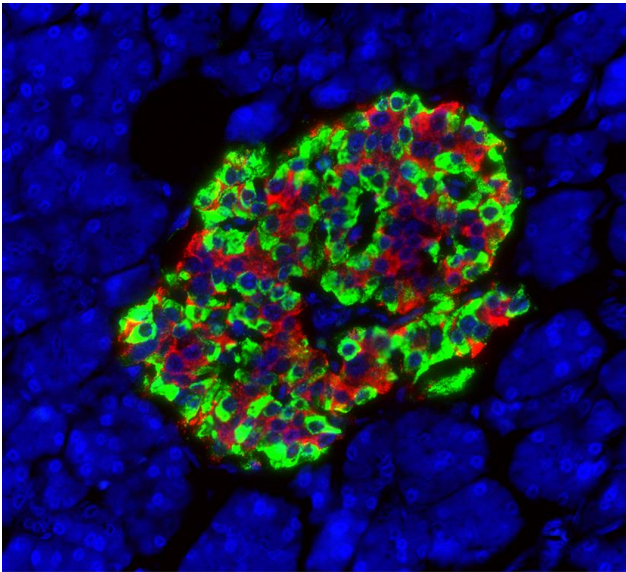
Antibody

[#10505 Anti-Glucagon \(52A1A\) Rat IgG MoAb](#)

Glucagon is a peptide hormone with a molecular weight of 3,485, consisting of 29 amino acid residues, secreted by pancreatic alpha cells. It acts on the liver to stimulate the production and release of glucose through glycogenolysis and glycogenesis, thereby raising blood glucose. Together with Insulin, it is involved in the regulation of glucose homeostasis.

Proglucagon, the precursor of glucagon, undergoes different processing depending on the cell in which it is produced, giving rise to a variety of related peptides. **This antibody recognises the C-terminus of glucagon and specifically detects glucagon produced by alpha cells.**

■ Human IHC staining

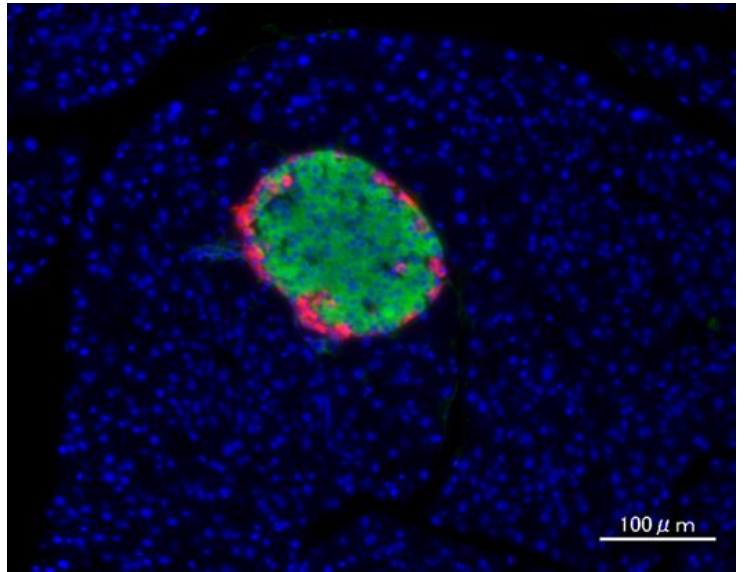


Human pancreatic endocrine tumors
Surgical resection pancreas (Normal part)

Red: Glucagon (52A1A) Green: Insulin Blue: DAPI

Photo was kindly provided by Dr. Katsuya Yabe,
Division of Endocrinology, Metabolism,
Hematological Science and Therapeutics, Yamaguchi University.

■ Mouse IHC staining



Wild-type mouse pancreas,
Paraffin-embedded section

Red: Glucagon (52A1A) Green: Insulin (DAKO A0564) Blue: DAPI

Photo was kindly provided by Professor Tadahiro Kitamura,
Institute for Molecular and Cellular Regulation, Gunma University.

References

Unger RH, Cherrington AD. Glucagonocentric restructuring of diabetes: a pathophysiologic and therapeutic makeover. *J Clin Invest.* 2012 Jan;122(1):4-12. doi: 10.1172/JCI60016. Epub 2012 Jan 3. PMID: 22214853; PMCID: PMC3248306.

Related Products

【 GLP-1 】	#27700 GLP-1, Active form (High Sensitivity) Assay Kit - IBL	#27788 GLP-1 (9-36/37) Assay Kit - IBL
	#27784 GLP-1, Active form Assay Kit - IBL	
【 GIP 】	#27201 Human GIP, Active form Assay Kit - IBL	#27203 Human GIP, Total Assay Kit - IBL
	#27701 Mouse GIP, Total (high sensitivity) Assay Kit - IBL	#27702 Mouse GIP, Active form (high sensitivity) Assay Kit - IBL
	#27703 Rat GIP, Total (high sensitivity) Assay Kit - IBL	#27704 Rat GIP, Active form (high sensitivity) Assay Kit - IBL
【 Insulin 】	#27705 Mouse/Rat Total Insulin (high sensitivity) Assay Kit - IBL	#27706 Mouse/Rat Intact Proinsulin Assay Kit - IBL
	#27707 Mouse/Rat Total Insulin CLEIA Kit - IBL	#27708 Mouse/Rat Intact Proinsulin CLEIA Kit - IBL
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