Nampt [PBEF/Visfatin]

Introduction

The NAD^+ biosynthesis pathway in mammals consists of two steps involving the enzymes nicotinamide phosphoribosyltransferase (Nampt [EC 2.4.2.12.]) and nicotinamide/nicotinic acid mononucleotide adenylyltransferase (Nmnat). Nampt converts nicotinamide into nicotinamide mononucleotide (NMN) which then is converted to NAD^+ by Nmnat. The rate limiting enzyme in the biosynthetic pathway of NAD^+ is Nampt [1]. Originally, Nampt was identified as pre-B cell colony enhancing factor (PBEF) a presumptive cytokine-like protein involved in subclinical inflammation [2, 3]. Later the protein was renamed Visfatin, a visceral fat-derived adipocytokine believed to mimic insulin action [4]. However this report was controversial resulting in the retraction of the paper [5]. Although Nampt may not directly bind to the insulin receptor as originally thought, Nampt does regulate insulin secretion in β cells [6] and can function as a cell survival factor [7].

Nampt forms dimers [8] and has been shown to be secreted. Secretion of Nampt is not inhibited by brefeldin A, suggesting a non-classical secretory pathway for Nampt [6]. Two forms of Nampt exist, an intracellular form (iNampt) and an extracellular form (eNampt). While the function of iNampt as an essential and rate-limiting NAD^+ biosynthetic enzyme is well established, the physiological role of eNampt is still a matter of debate [9]. It has been suggested that eNampt converts nicotin amide into extracellular NMN in the blood which functions as a systemic signaling molecule regulating β cell function [6, 10]. Recently, eNampt has also been shown to activate pro-inflammatory signaling and to be involved in the induction of inducible nitric oxide synthase (iNOS; iNOS II) through an ERK1/2 NF-κB dependent mechanism [11].

NAD^+ is a classic coenzyme in cellular redox reactions and hence is involved in a broad range of biological functions. Of particular interest is its regulatory role of the NAD-dependent deacetylase sirtuin 1 (SIRT1; Sirt1; Sir2 (yeast)) activity [1]. SIRT1 is a deacetylase that requires NAD^+ for its function [1, 12]. By modifying chromatin-associated proteins SIRT1 plays an important role in the epigenetic regulation of metabolism in response to nutrient availability [13]. Nampt and SIRT1 together with a third enzyme AMP-activated protein kinase (AMPK) function as a cellular signaling checkpoint sensing and reacting to nutrient availability [14].

CONTINUED ON NEXT PAGE

Nampt-mediated NAD^+ biosynthesis has widespread actions on cellular senescence, aging, obesity, diabetes, cancer, and inflammation.

Interestingly, Nampt expression levels show circadian oscillation. A circadian clock feedback cycle exists where clock genes together with SIRT1 regulate Nampt expression [15, 16]. Thus, SIRT1 controls the synthesis of NAD^+, its own cofactor.

A systemic regulatory network for mammalian aging, called "NAD World" has been proposed [17, 18]. NAD^+ biosynthesis and the dependence of SIRT1 on NAD^+ are central to this hypothesis. Cells such as pancreatic β cells and neurons that do not have adequate amounts of iNampt would depend on systemic NMN biosynthesis by eNampt for NAD^+. If systemic NAD^+ biosynthesis declines, these cells would exhibit functional problems due to inadequate NAD^+ availability and the corresponding reduction in SIRT1 activity. This situation might contribute to typical age-associated complications such as type 2 diabetes [19].

LITERATURE REFERENCES:

[1] The NAD biosynthesis pathway mediated by nicotinamide phosphoribosyltransferase regulates Sir2 activity in mammalian cells: J.R. Revollo, et al.; J. Biol. Chem. **279,** 50754 (2004) ▪ **[2]** Cloning and characterization of the cDNA encoding a novel human pre-B-cell colony-enhancing factor: B. Samal, et al.; Mol. Cell. Biol. **14,** 1431 (1994) ▪ **[3]** Pre-B cell colony-enhancing factor (PBEF)/Visfatin: a novel mediator of innate immunity: T. Luk, et al.; J. Leukoc. Biol. **83,** 804 (2008) ▪ **[4]** Visfatin: a protein secreted by visceral fat that mimics the effects of insulin: A. Fukuhara, et al.; Science **307,** 426 (2005) ▪ **[5]** Retraction: A. Fukuhara, et al.; Science **318,** 565 (2007) ▪ **[6]** Nampt/PBEF/Visfatin regulates insulin secretion in beta cells as a systemic NAD biosynthetic enzyme: J.R. Revollo, et al.; Cell Metab. **6,** 363 (2007) ▪ **[7]** Nutrient-sensitive mitochondrial NAD+ levels dictate cell survival: H. Yang, et al.; Cell **130,** 1095 (2007) ▪ **[8]** Structure of Nampt/PBEF/Visfatin, a mammalian NAD+ biosynthetic enzyme: T. Wang, et al.; Nat. Struct. Mol. Biol. **13,** 661 (2006) ▪ **[9]** Extracellular Nampt promotes macrophage survival via a nonenzymatic interleukin-6/STAT3 signaling mechanism: Y. Li, et al.; J. Biol. Chem. **283,** 34833 (2008) ▪ **[10]** Nampt/PBEF/Visfatin: a new player in beta cell physiology and in metabolic diseases?: T. Tanaka & Y. Nabeshima; Cell Metab. **6,** 341 (2007) ▪ **[11]** Extracellular PBEF/Nampt/Visfatin activates pro-inflammatory signalling in human vascular smooth muscle cells through nicotinamide phosphoribosyltransferase activity: T. Romacho, et al.; Diabetologia **52,** 2455 (2009) ▪ **[12]** Sir2: an NAD-dependent histone deacetylase that connects chromatin silencing, metabolism, and aging: S. Imai, et al.; Cold Spring Harb. Symp. Quant. Biol. **65,** 297 (2000) ▪ **[13]** Therapeutic potential of SIRT1 and Nampt-mediated NAD biosynthesis in type 2 diabetes: S. Imai & W. Kiess; Front. Biosci. **14,** 2983 (2009) ▪ **[14]** Glucose restriction inhibits skeletal myoblast differentiation by activating SIRT1 through AMPK-mediated regulation of Nampt: M. Fulco, et al.; Dev. Cell **14,** 661 (2008) ▪ **[15]** Circadian control of the NAD+ salvage pathway by CLOCK-SIRT1: Y. Nakahata, et al.; Science **324,** 654 (2009) ▪ **[16]** Circadian clock feedback cycle through Nampt-mediated NAD+ biosynthesis: K.M. Ramsey, et al.; Science **324,** 651 (2009) ▪ **[17]** The NAD World: a new systemic regulatory network for metabolism and aging--Sirt1, systemic NAD biosynthesis, and their importance: S. Imai; Cell Biochem. Biophys. **53,** 65 (2009) ▪ **[18]** From heterochromatin islands to the NAD World: A hierarchical view of aging through the functions of mammalian Sirt1 and systemic NAD biosynthesis: S. Imai; Biochim. Biophys. Acta **1790,** 997 (2009) ▪ **[19]** Age-associated loss of Sirt1-mediated enhancement of glucose-stimulated insulin secretion in beta cell-specific Sirt1-overexpressing (BESTO) mice: K.M. Ramsey, et al.; Aging Cell **7,** 78 (2008)

FK-866 – Highly Specific Nampt Inhibitor

FK-866 acts as highly specific noncompetitive inhibitor of Nampt and induces apoptosis by gradual depletion of the intracellular coenzyme NAD^+. It is the first described highly potent and specific inhibitor of Nampt that has no primary effect on cellular energy metabolism. FK-866 offers new opportunities to investigate the actual triggers opening the mitochondrial PTP complex and may be used for treatment of deregulation of apoptosis, which is closely related to immunological diseases and cancer.

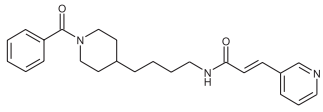
LIT: FK866, a highly specific noncompetitive inhibitor of nicotinamide phosphoribosyltransferase, represents a novel mechanism for induction of tumor cell apoptosis: Nopncompe M. Hasmann & I. Schemainda; Cancer Res. **63,** 7436 (2003)

FK-866

ALX-270-501-M001	1 mg
ALX-270-501-M005	5 mg

Selective inhibitor of the nicotinamide pathway dependent NAD^+ synthesis, causing NAD^+ depletion. Highly specific, non-competitive inhibitor of nicotinamide phosphoribosyltransferase (Nampt/NAPRT) for both the enzyme/substrate complex and the free enzyme (K_i=0.4 nM and K_i=0.3 nM, respectiveley). NAD^+ depletion by FK-866 directs delayed cell death by apoptosis in Hep-G2 human liver carcinoma cells (IC_{50}=~1 nM).

Causes premature senescence in normal human smooth muscle cells. Induces autophagy in SH-SY5Y neuroblastoma cells, as indicated by the formation of LC3-positive vesicles.



Latest Insight

A Rare Nampt Gene Variation is Associated with Protection from Obesity

A.I. Blakemore, et al. identified a rare variant in the Nampt gene that is associated with protection from obesity. One single-nucleotide polymorphism (SNP), rs1048781, located in intron 4 of the Nampt gene was linked with severe obesity.

LIT: A rare variant in the Visfatin gene (Nampt/PBEF1) is associated with protection from obesity: A.I. Blakemore, et al.; Obesity **17,** 1549 (2009)

Selected Review Articles

- The regulation of nicotinamide adenine dinucleotide biosynthesis by Nampt/PBEF/Visfatin in mammals: J.R. Revollo, et al.; Curr. Opin. Gastroenterol. **23,** 164 (2007)
- Energy-responsive timekeeping: D.A. Bechtold; J. Genet. **87,** 447 (2008)
- Nicotinamide phosphoribosyltransferase (Nampt): a link between NAD biology, metabolism, and diseases: S. Imai; Curr. Pharm. Des. **15,** 20 (2009)
- Therapeutic potential of SIRT1 and Nampt-mediated NAD biosynthesis in type 2 diabetes: S. Imai & W. Kiess; Front. Biosci. **14,** 2983 (2009)
- The NAD World: a new systemic regulatory network for metabolism and aging--Sirt1, systemic NAD biosynthesis, and their importance: S. Imai; Cell Biochem. Biophys. **53,** 65 (2009)
- From heterochromatin islands to the NAD World: A hierarchical view of aging through the functions of mammalian Sirt1 and systemic NAD biosynthesis: S. Imai; Biochim. Biophys. Acta **1790,** 997 (2009)
- Nampt: linking NAD biology, metabolism and cancer: A. Garten, et al.; Trends Endocrinol. Metab. **20,** 130 (2009)

Nampt (Visfatin/PBEF) Proteins

Product	Source/Host	Prod. No.	Size
Nampt (human), (rec.)	Produced in HEK 293 cells. Full length human Nampt (Visfatin/PBEF) (aa 1-491) is fused at the N-terminus to a FLAG®-tag.	ALX-201-336-C010 ALX-201-336-C050	10 µg 50 µg
Nampt (human), (rec.) (His-tag)	Produced in *E. coli.* Full length human Nampt (Visfatin/PBEF) (aa 1-491) is fused at the C-terminus to a His-tag.	ALX-201-319-C050	50 µg

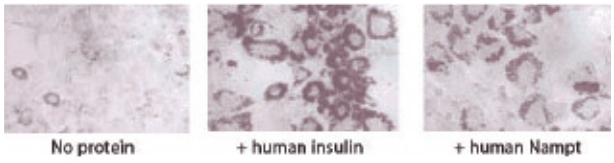


FIGURE: Adipogenic effects of recombinant human Nampt on differentiating 3T3-L1 cells.

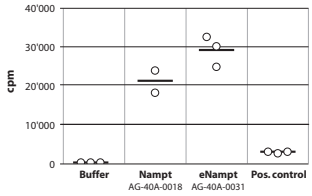


FIGURE: Activities of recombinant Nampts

Measurement of Nampt enzymatic activity was performed as described previously (G. C. Elliott, et al.; Anal. Biochem. **107,** 199 (1980)).

Figure courtesy of A. Garten & W. Kiess, University of Leipzig, Germany.

PRODUCT SPECIFIC LITERATURE REFERENCES:

- Visfatin is present in bovine mammary epithelial cells, lactating mammary gland and milk, and its expression is regulated by cAMP pathway: T. Yonezawa, et al.; FEBS Lett. **580,** 6635 (2006)
- Visfatin, an adipocytokine with proinflammatory and immunomodulating properties: A.R. Moschen, et al.; J. Immunol. **178,** 1748 (2007)
- Visfatin is a Novel eNOS Activator: F. Lovren, et al.; Am. J. Physiol. Endocrinol. Metab. **6,** 296 (2009)
- ssDNA aptamer-based surface plasmon resonance biosensor for the detection of retinol binding protein 4 for the early diagnosis of type 2 diabetes: S.J. Lee, et al.; Anal. Chem. **80,** 2867 (2008)

Nampt (mouse), (rec.)	Produced in HEK 293 cells. Full length mouse Nampt (Visfatin/PBEF) (aa 1-491) is fused at the N-terminus to a FLAG®-tag.	ALX-201-364-C010 ALX-201-364-C050	10 µg 50 µg
Nampt (mouse), (rec.) (His-tag)	Produced in *E. coli.* Full length mouse Nampt (Visfatin/PBEF) (aa 1-491) is fused at the C-terminus to a His-tag.	ALX-201-318-C050	50 µg
Nampt (rat), (rec.)	Produced in HEK 293 cells. Full length rat Nampt (Visfatin/PBEF) (aa 1-491) is fused at the N-terminus to a FLAG®-tag.	ALX-201-366-C010 ALX-201-366-C050	10 µg 50 µg
Nampt (rat), (rec.) (His-tag)	Produced in *E. coli.* Full length rat Nampt (Visfatin/PBEF) (aa 1-491) is fused at the C-terminus to a His-tag.	ALX-201-332-C050	50 µg

Nampt (Visfatin/PBEF) Antibodies

Product	Specificity	Lit.	Application	Prod. No.	Size
Nampt, mAb (OMNI379) Isotype: Mouse IgG2	Recognizes human, mouse and rat Nampt.	**[1], [2], [4]**	IHC (PS), ICC, IP, WB	ALX-804-717-C050 ALX-804-717-C100 ALX-804-717B-C050 Biotin	50 µg 100 µg 50 µg

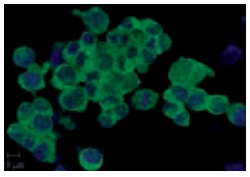


FIGURE: Staining of human HEK293 cells with Nampt, mAb (OMNI379).

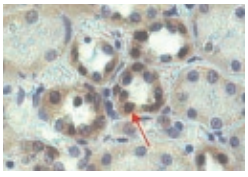


FIGURE: Immunohistochemical staining of Nampt with Nampt, mAb (OMNI379) in human tissue.

Nampt (human), pAb	Recognizes human Nampt. Weakly cross-reacts with mouse Nampt.		IHC (PS), WB	ALX-210-425-C100 ALX-210-425B-C050 Biotin	100 µg 50 µg
Nampt (human) (CT), pAb	Recognizes human Nampt. Weakly cross-reacts with mouse Nampt.	**[3], [4]**	IHC (PS), WB	ALX-210-427-C100	100 µg
Nampt (human) (NT), pAb	Recognizes human Nampt. Weakly cross-reacts with mouse Nampt.		WB	ALX-210-426-C100	100 µg
Nampt (mouse), pAb	Recognizes mouse Nampt. Weakly cross-reacts with human Nampt.		WB	ALX-210-428-C100	100 µg
Nampt (rat), pAb	Recognizes human (weak) and rat Nampt.		WB	ALX-210-434-C100	100 µg

PRODUCT SPECIFIC LITERATURE REFERENCES:

[1] Molecular Characteristics of Serum Visfatin and Differential Detection by Immunoassays: A. Korner, et al.; J. Clin. Endocrinol. Metab. **92,** 4783 (2007)

[2] Nampt/PBEF/Visfatin Regulates Insulin Secretion in beta Cells as a Systemic NAD Biosynthetic Enzyme: J.R. Revollo, et al.; Cell. Metab. **6,** 363 (2007)

[3] Regulation of pre-B cell colony-enhancing factor by STAT-3-dependent interleukin-6 trans-signaling: implications in the pathogenesis of rheumatoid arthritis: M.A. Nowell, et al.; Arthritis Rheum. **54,** 2084 (2006)

[4] Hypoxic induction of human Visfatin gene is directly mediated by hypoxia-inducible factor-1: S.K. Bae, et al.; FEBS Lett. **580,** 4105 (2006)

Nampt ELISA Kits

Nampt (human) ELISA kit

AG-45A-0006EK-KI01		1 x 96 wells
AG-45A-0006TP-KI01	Twin Plex	2 x 96 wells
AG-45A-0006PP-KI01	Penta Plex	5 x 96 wells

For the quantitative determination of Nampt (Visfatin/PBEF) in human serum. **SENSITIVITY:** 30pg/ml (range 0 to 16ng/ml).

PRODUCT SPECIFIC LITERATURE REFERENCES:

- Visfatin is present in bovine mammary epithelial cells, lactating mammary gland and milk, and its expression is regulated by cAMP pathway: T. Yonezawa, et al.; FEBS Lett. **580,** 6635 (2006)
- Molecular characteristics of serum Visfatin and differential detection by immunoassays: A. Körner, et al.; J. Clin. Endocrinol. Metab. **92,** 4783 (2007)
- Serum levels of the adipokine Visfatin are increased in pre-eclampsia: M. Fasshauer, et al.; Clin. Endocrinol. **69,** 69 (2008)
- Correlation of circulating full-length Visfatin (PBEF/Nampt) with metabolic parameters in subjects with and without diabetes: a cross-sectional study: R. Retnakaran, et al.; Clin. Endocrinol. **69,** 885 (2008)
- Longitudinal changes in pancreatic and adipocyte hormones following Roux-en-Y gastric bypass surgery: M.M. Swarbrick, et al.; Diabetologia **51,** 1901 (2008)
- Adipokines influencing metabolic and cardiovascular disease are differentially regulated in maintenance hemodialysis: M. Ziegelmeier, et al.; Metabolism **57,** 1414 (2008)
- Ethnic-specific Correlations of Visfatin With Circulating Markers of Endothelial Inflammation and Function: M. Reimann, et al.; Obesity **17,** 2210 (2009)
- Visfatin activates eNOS via Akt and MAP kinases and improves endothelial cell function and angiogenesis in vitro and in vivo: translational implications for atherosclerosis: F. Lovren, et al.; Am. J. Physiol. Endocrinol. Metab. **296,** E1440 (2009)
- Circulating Visfatin in chronic obstructive pulmonary disease: X. Liu, et al.; Nutrition **25,** 373 (2009)
- Visfatin in gestational diabetes: serum level and mRNA expression in fat and placental tissue: B. Telejko, et al.; Diabetes Res. Clin. Pract. **84,** 68 (2009)
- Plasma Visfatin concentrations after a lifestyle intervention were directly associated with inflammatory markers: S. Bo, et al.; Nutr. Metab. Cardiovasc. Dis. **19,** 423 (2009)
- Release of 12 Adipokines by Adipose Tissue, Nonfat Cells, and Fat Cells From Obese Women: J.N. Fain, et al.; Obesity (Silver Spring), **Epub ahead of print,** (2009)
- Plasma Visfatin and ghrelin response to prolonged sculling in competitive male rowers: J. Jurimae, et al.; Med. Sci. Sports Exerc. **41,** 137 (2009)
- Visfatin in gestational diabetes: serum level and mRNA expression in fat and placental tissue: B. Telejko, et al.; Diabetes Res. Clin. Pract. **84,** 68 (2009)
- Adipokines and systemic lupus erythematosus: relationship with metabolic syndrome and cardiovascular disease risk factors: M. Vadacca, et al.; J. Rheumatol. **36,** 68 (2009)
- Active Visfatin is elevated in serum of maintenance haemodialysis patients and correlates inversely with circulating HDL cholesterol: K.D. Nusken, et al.; Nephrol. Dial. Transplant. **24,** 2832 (2009)

Nampt (human) (intracellular) ELISA kit

AG-45A-0008EK-KI01		1 x 96 wells
AG-45A-0008TP-KI01	Twin Plex	2 x 96 wells

For the quantitative determination of Nampt (Visfatin/PBEF) in human cell lysates. **SENSITIVITY:** 30pg/ml (range 0 to 32ng/ml).

Nampt (mouse/rat) dual ELISA kit

AG-45A-0007EK-KI01		1 x 96 wells
AG-45A-0007TP-KI01	Twin Plex	2 x 96 wells
AG-45A-0007PP-KI01	Penta Plex	5 x 96 wells

For the quantitative determination of Nampt (Visfatin/PBEF) in mouse or rat serum. **SENSITIVITY:** 50pg/ml (range 0 to 64ng/ml).

Nampt (mouse/rat) (intracellular) dual ELISA kit

AG-45A-0009EK-KI01		1 x 96 wells
AG-45A-0009ETP-KI01	Twin Plex	2 x 96 wells

For the quantitative determination of Nampt (Visfatin/PBEF) in mouse or rat cell lysates. **SENSITIVITY:** 50pg/ml (range 0 to 64ng/ml).

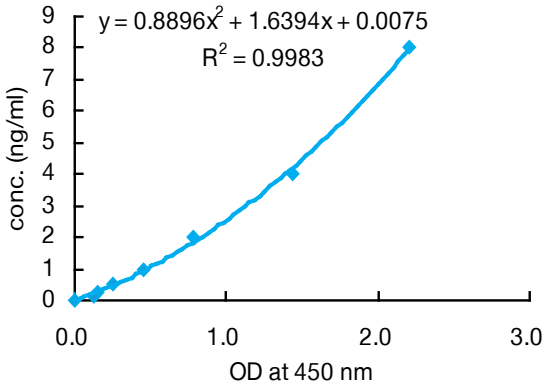


FIGURE: Standard curve for Nampt (human) ELISA kit (Prod. No. AG-45A-0006).

Latest Insight

Nampt is Essential for G-CSF-induced Myeloid Differentiation

J. Skokowa, et al. identified Nampt as an essential enzyme mediating granulocyte colony-stimulation factor (G-CSF)-triggered granulopoiesis in healthy individuals and in individuals with severe congenital neutropenia. The molecular events induced by Nampt include NAD^+-dependent activation of sirtuin 1 (SIRT1), induction of CCAAT/enhancer binding proteins α and β, and upregulation of G-CSF synthesis and G-CSF receptor expression. Their results point out a role of the NAD^+ metabolic pathway in G-CSF-triggered myelopoiesis.

LIT: Nampt is essential for the G-CSF-induced myeloid differentiation via a NAD(+)-sirtuin-1-dependent pathway: J. Skokowa, et al.; Nat. Med. **15,** 151 (2009)

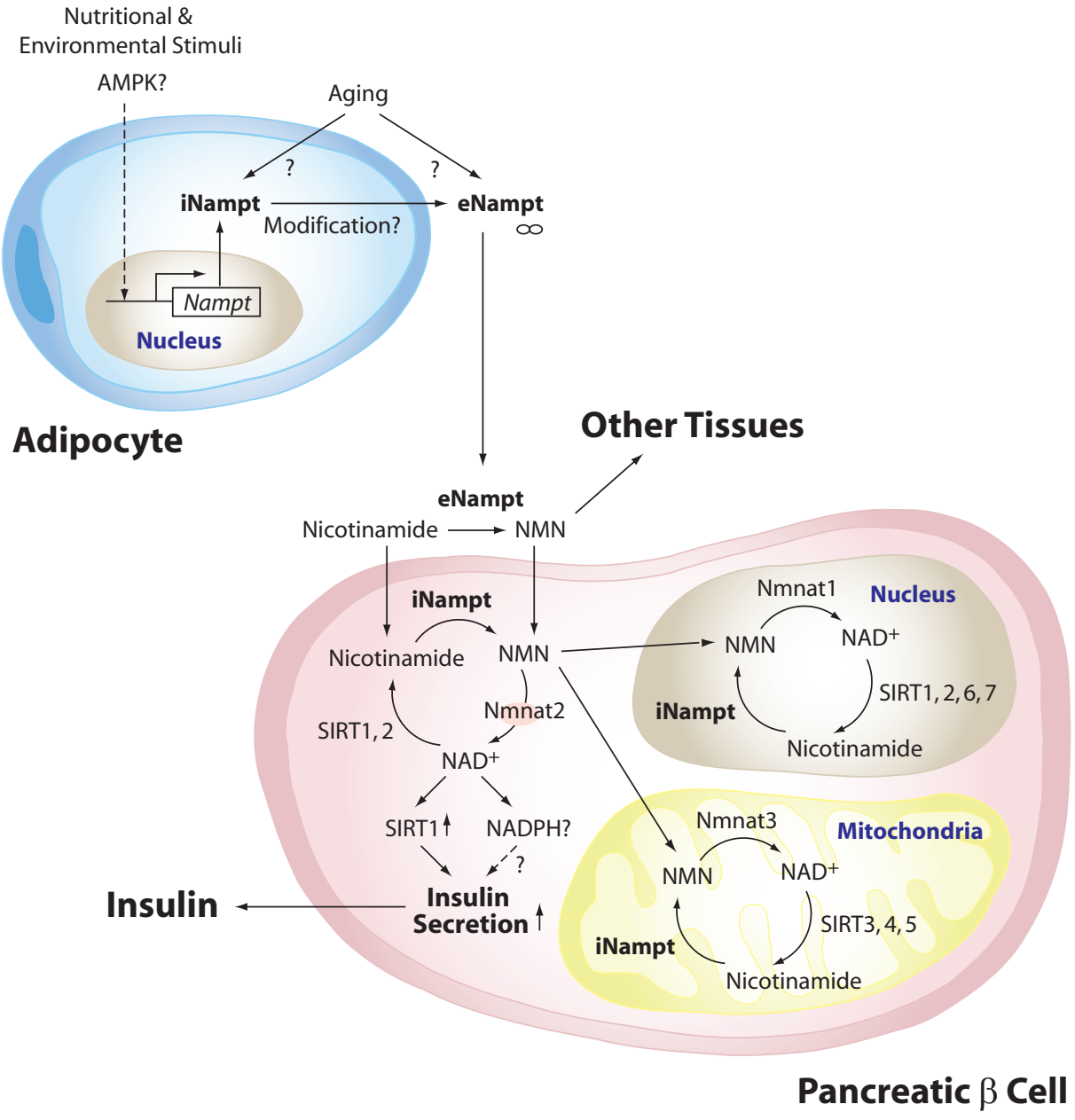


FIGURE: A model for the secretion of eNampt and the regulation of glucose-stimulated insulin secretion by Nampt-mediated systemic NAD⁺ biosynthesis in pancreatic β cells and in each subcellular compartment.

Nampt functions as an intra- and extracellular NAD⁺ biosynthetic enzyme (iNampt and eNampt). The expression of the Nampt gene is regulated in response to a variety of nutritional and environmental stimuli. AMP-activated protein kinase (AMPK) might be involved in this regulation. Nicotinamide, a form of vitamin B3, is converted to nicotinamide mononucleotide (NMN) by iNampt in the cell and also by eNampt in blood circulation. Circulating NMN is distributed to tissues and organs and transported to the inside of cells likely through an unidentified transporter and rapidly converted to NAD⁺ by Nmnat. In β cells, Nampt-mediated NAD⁺ biosynthesis promotes glucose-stimulated insulin secretion by activating SIRT1 and possibly by increasing other metabolic signals, such as NADPH. Nampt-mediated systemic NAD⁺ biosynthesis also declines with advanced age, resulting in reduced SIRT1 activity and insulin secretion in aged β cells. The secretion or the enzymatic activity of eNampt might be affected by aging. It is still unclear if NMN is transported to the nucleus and mitochondria.

Adapted from: *Nampt/PBEF/Visfatin regulates insulin secretion in beta cells as a systemic NAD biosynthetic enzyme:* J.R. Revollo, et al.; Cell Metab. **6,** 363 (2007) / *Nicotinamide phosphoribosyltransferase (Nampt): a link between NAD biology, metabolism, and diseases:* S. Imai; Curr. Pharm. Des. **15,** 20 (2009)

Sirtuins

Proteins

SIRT1 (human), (rec.) (His-tag)
BML-SE239-0100 100 U

Produced in *E. coli*. Contains a N-terminal His-tag. **SPECIFIC ACTIVITY:** One unit will deacetylate 1pmol/min of *Fluor de Lys*® substrate.

SIRT2 (human), (rec.) (His-tag)
BML-SE251-0500 500 U

Produced in *E. coli*. Contains a N-terminal His-tag. **SPECIFIC ACTIVITY:** One unit will deacetylate 1pmol/min of *Fluor de Lys*® substrate.

SIRT3 (human), (rec.) (His-tag)
BML-SE270-0500 500 U

Produced in *E. coli*. Active SIRT3 (aa 102-199). Contains a N-terminal His-tag. **SPECIFIC ACTIVITY:** One unit will deacetylate 1pmol/min of *Fluor de Lys*® substrate.

SIRT5 (human), (rec.) (His-tag)
BML-SE555-0500 500 µg

Produced in *E. coli*. **SPECIFIC ACTIVITY:** One unit will deacetylate 1pmol/min of *Fluor de Lys*® substrate.

Antibodies

SIRT1 (human), pAb
BML-SA427-0100 100 µl

From rabbit. **IMMUNOGEN:** Recombinant human SIRT1 (sirtuin 1). **SPECIFICITY:** Recognizes human SIRT1. **APPLICATION:** WB.

SIRT2 (human), pAb
BML-SA444-0100 100 µl

From rabbit. **IMMUNOGEN:** Recombinant human SIRT2. **SPECIFICITY:** Recognizes native and recombinant human SIRT2. Does not cross-react with other sirtuins tested (SIRTs 1, 3 and 5). **APPLICATION:** WB.

SIRT3, pAb
BML-SA463-0100 100 µl

From rabbit. **IMMUNOGEN:** Recombinant human SIRT3. **SPECIFICITY:** Recognizes human rat and cow SIRT3. **APPLICATION:** WB.

SIRT5, pAb
BML-SA464-0100 100 µl

From rabbit. **IMMUNOGEN:** Recombinant human SIRT5. **SPECIFICITY:** Recognizes human, rat, mouse and cow SIRT5. Detects a band of ~29 kDa by Western blot. **APPLICATION:** WB.

Sirtuin 1 (human), (intracellular) ELISA Kit

AG-45A-0029EK-KI01 1 x 96 wells

AG-45A-0029TP-KI01 Twin Plex 2 x 96 wells

For the quantitative determination of intracellular sirtuin 1 in human cell lysates. **SPECIFICITY:** Does not cross-react with human sirtuin 2, 5, and 6. **SENSITIVITY:** 30pg/ml

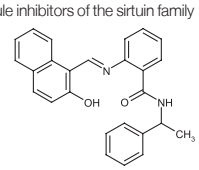
Standard Inhibitor

Sirtinol
[2-[(2-Hydroxynaphthalen-1-yl-methylene) amino]-N-(1-phenethyl)benzamide]

ALX-270-308-M001 1 mg

ALX-270-308-M005 5 mg

Specific cell permeable inhibitor of the sirtuin family of NAD-dependent deacetylases (ySir2: IC_{50}=48µM; hSIRT1: IC_{50}=60µM; hSIRT2: IC_{50}=58µM) with no effect on human HDAC1. Reported to inhibit Sir2p transcriptional silencing activity *in vivo* (IC_{50}=25µM) and NAD-dependent histone deacetylase activity of purified recombinant yeast Sir2p (IC_{50}=70µM) and hSIRT2 (IC_{50}=40µM) *in vitro*.



LIT: Identification of a class of small molecule inhibitors of the sirtuin family of NAD-dependent deacetylases by phenotypic screening: C.M. Grozinger, et al.; J. Biol. Chem. **276,** 38837 (2001) ▪ Sirt1 inhibitor, Sirtinol, induces senescence-like growth arrest with attenuated Ras-MAPK signaling in human cancer cells: H. Ota, et al.; Oncogene **25,** 176 (2006) ▪ **For a comprehensive bibliography please visit our website.**

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