



Nomenclature

What is in a name?

My name Jose' Jimenez = Bill Dana

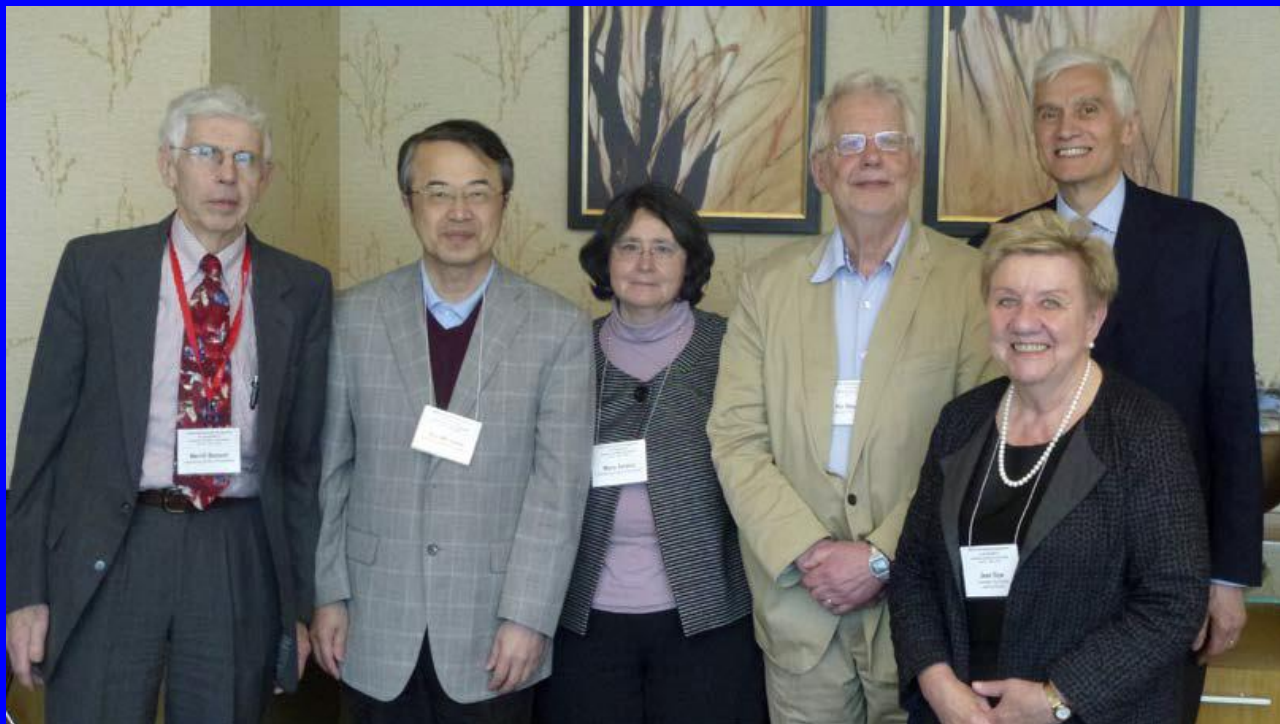
John L.C. Savony = Frank Fontaine

Three categories of Amyloid Terms

- 1. Amyloidologists, Amyloid Centers,
Researchers “official nomenclature”**
- 2. Medical personnel, Physicians, Nurses,
Counselors**
- 3. Patients and Families**

Amyloidologists, Amyloid Centers, Researchers

Nomenclature Committee meets biannually



Nomenclature Committee

May 2014

Left to right:

**Merrill D. Benson – Indianapolis, IN,
USA**

Shu-ichi Ikeda – Matsumoto, Japan

Maria J. Saraiva – Porto, Portugal

Per Westermark – Uppsala, Sweden

Jean D. Sipe – Boston, MA, USA

Giampaolo Merlini – Pavia, Italy

**Joel N. Buxbaum – La Jolla, CA, USA
(not in picture)**

Table 1. Amyloid fibril proteins and their precursors in human^a.

Fibril protein	Precursor protein	Systemic and/ or localized	Acquired or hereditary	Target organs
AL	Immunoglobulin light chain	S, L	A, H	All organs, usually except CNS
AH	Immunoglobulin heavy chain	S, L	A	All organs except CNS
AA	(Apo) Serum amyloid A	S	A	All organs except CNS
ATTR	Transthyretin, wild type	S	A	Heart mainly in males, ligaments, tenosynovium
	Transthyretin, variants	S	H	PNS, ANS, heart, eye, leptomeninges
Aβ2M	β2-Microglobulin, wild type	S	A	Musculoskeletal system
	β2-Microglobulin, variant	S	H	ANS
AApoAI	Apolipoprotein A I, variants	S	H	Heart, liver, kidney, PNS, testis, larynx (C-terminal variants), skin (C-terminal variants)
AApoAII	Apolipoprotein A II, variants	S	H	Kidney
AApoAIV	Apolipoprotein A IV, wild type	S	A	Kidney medulla and systemic
AApoCII	Apolipoprotein C II, variants	S	H	Kidney
AApoCIII	Apolipoprotein C III, variants	S	H	Kidney
AGel	Gelsolin, variants	S	H	PNS, cornea
ALys	Lysozyme, variants	S	H	Kidney
ALECT2	Leukocyte chemotactic factor-2	S	A	Kidney, primarily
AFib	Fibrinogen α, variants	S	H	Kidney, primarily
ACys	Cystatin C, variants	S	H	PNS, skin
ABri	ABriPP, variants	S	H	CNS
ADan*	ADanPP, variants	L	H	CNS
Aβ	Aβ protein precursor, wild type	L	A	CNS
	Aβ protein precursor, variant	L	H	CNS
AαSyn	α-Synuclein	L	A	CNS
ATau	Tau	L	A	CNS
APrP	Prion protein, wild type	L	A	CJD, fatal insomnia
	Prion protein variants	L	H	CJD, GSS syndrome, fatal insomnia
	Prion protein variant	S	H	PNS
ACal	(Pro)calcitonin	L	A	C-cell thyroid tumors
AIAPP	Islet amyloid polypeptide**	L	A	Islets of Langerhans, insulinomas
AANF	Atrial natriuretic factor	L	A	Cardiac atria
APro	Prolactin	L	A	Pituitary prolactinomas, aging pituitary
AIns	Insulin	L	A	Iatrogenic, local injection
ASPC***	Lung surfactant protein	L	A	Lung
AGal7	Galectin 7	L	A	Skin
ACor	Corneodesmosin	L	A	Cornified epithelia, hair follicles
AMed	Lactadherin	L	A	Senile aortic, media
AKer	Kerato-epithelin	L	A	Cornea, hereditary
ALac	Lactoferrin	L	A	Cornea
AOAAP	Odontogenic ameloblast-associated protein	L	A	Odontogenic tumors
ASem1	Semenogelin 1	L	A	Vesicula seminalis
AEnf	Enfurvitide	L	A	Iatrogenic

^aProteins are listed, when possible, according to relationship. Thus, apolipoproteins are grouped together, as are polypeptide hormones.

*ADan is the product of the same gene as ABri.

**Also called amylin.

***Not proven by amino acid sequence analysis.

Physicians, Nurses, Counselors

- **FAP**
- **FAC**
- **ATTR_m**
- **ATTR_{wt}**
- **hTTR_{pn}**
- **HFpEF**

More confusion!

Amyloid protein designation vs. Genetics designation

V30M = V50M

I107 V = I 127 V

Human Transthyretin Amino Acid Sequence

Signal peptide																			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Met	Ala	Ser	His	Arg	Leu	Leu	Leu	Leu	Cys	Leu	Ala	Gly	Leu	Val	Phe	Val	Ser	Glu	Ala
M	A	S	H	R	L	L	L	L	C	L	A	G	L	V	F	V	S	E	A
Mature protein																			
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Gly	Pro	Thr	Gly	Thr	Gly	Glu	Ser	Lys	Cys	Pro	Leu	Met	Val	Lys	Val	Leu	Asp	Ala	Val
G	P	T	G	T	G	E	S	K	C	P	L	M	V	K	V	L	D	A	V
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Arg	Gly	Ser	Pro	Ala	Ile	Asn	Val	Ala	Val	His	Val	Phe	Arg	Lys	Ala	Ala	Asp	Asp	Thr
R	G	S	P	A	I	N	V	A	V	H	V	F	R	K	A	A	D	D	T
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Trp	Glu	Pro	Phe	Ala	Ser	Gly	Lys	Thr	Ser	Glu	Ser	Gly	Glu	Leu	His	Gly	Leu	Thr	Thr
W	E	P	F	A	S	G	K	T	S	E	S	G	E	L	H	G	L	T	T
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Glu	Glu	Glu	Phe	Val	Glu	Gly	Ile	Tyr	Lys	Val	Glu	Ile	Asp	Thr	Lys	Ser	Tyr	Trp	Lys
E	E	E	F	V	E	G	I	Y	K	V	E	I	D	T	K	S	Y	W	K
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Ala	Leu	Gly	Ile	Ser	Pro	Phe	His	Glu	His	Ala	Glu	Val	Val	Phe	Thr	Ala	Asn	Asp	Ser
A	L	G	I	S	P	F	H	E	H	A	E	V	V	F	T	A	N	D	S
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Gly	Pro	Arg	Arg	Tyr	Thr	Ile	Ala	Ala	Leu	Leu	Ser	Pro	Tyr	Ser	Tyr	Ser	Thr	Thr	Ala
G	P	R	R	Y	T	I	A	A	L	L	S	P	Y	S	Y	S	T	T	A
141	142	143	144	145	146	147													
121	122	123	124	125	126	127													
Val	Val	Thr	Asn	Pro	Lys	Glu													
V	V	T	N	P	K	E													

Upper row numbering: Includes amino acids in signal peptide, which is cleaved from TTR during secretion from hepatocyte.

Lower row numbering: Based on amino acids comprising TTR present in serum.

Name	Symbol	
	3-Letter	1-Letter
Alanine	Ala	A
Arginine	Arg	R
Asparagine	Asn	N
Aspartic acid	Asp	D
Cysteine	Cys	C
Glutamic Acid	Glu	E
Glutamine	Gln	Q
Glycine	Gly	G
Histidine	His	H
Isoleucine	Ile	I
Leucine	Leu	L
Lysine	Lys	K
Methionine	Met	M
Phenylalanine	Phe	F
Proline	Pro	P
Serine	Ser	S
Threonine	Thr	T
Tryptophan	Trp	W
Tyrosine	Tyr	Y
Valine	Val	V

MUTATION	CODON CHANGE	CLINICAL FEATURES*	GEOGRAPHIC KINDREDS	MUTATION	CODON CHANGE	CLINICAL FEATURES*	GEOGRAPHIC KINDREDS
Cys10Arg	TGT - CGT	Heart, Eye, PN	USA (PA)	Glu54Gln	GAG - CAG	Heart, PN	Romanian
Leu12Pro	CTG - CCG	LM	UK	Leu55Arg	CTG - CGG	LM	Germany
Met13Lys	ATG - AAG		France	Leu55Pro	- CAG	Eye, PN	USA, Sweden
Asp18Glu	GAT - GAA	PN	South America, USA		- CCG	Heart, AN, Eye	USA, Taiwan
Asp18Gly	- GGT	LM	Hungary	His56Arg		Heart	USA
Asp18Asn	- AAT	Heart	USA	Gly57Arg	CAT - CGT	Heart, PN	Sweden
Ala19Asp	GCT - GAT	Heart	Caucasian	Leu58His	GGG - AGG	Heart, PN	USA (MD) (FAP II)
Val20Ile	GTC - ATC	Heart, CTS	Germany, USA	Thr59Arg	CTC - CAC	CTS, Heart	Japan
Ser23Asn	AGT - AAT	Heart	USA	Thr59Lys	- CCG	CTS, AN, Eye	Japan
Pro24Ser	CCT - TCT	Heart, CTS, PN	USA	Thr60Ala	ACA - AGA	Heart, AN	Italy, USA (Chinese)
Ala25Ser	GCC - TCC	Heart, CTS, PN	USA	Glu61Lys	- AAA	Heart, PN, AN	USA (Appalachian)
Ala25Thr	- ACC	LM, PN	Japan	Glu61Gly	ACT - GCT	Heart, CTS	Japan
Val28Met	GTG - ATG	PN, AN	Portugal	Glu62Lys	GAG - AAG	PN	USA
Val30Met	- ATG	PN, AN, Eye, LM	Portugal, Japan, Sweden, USA (FAP I)	Phe64Leu	- GGG	Heart, PN	USA
Val30Ala	- GCG	Heart, AN	USA	Phe64Ile	GAG - AAG	PN	Italy
Val30Leu	- CTG	PN, Heart	Japan, Sweden		TTT - CTT/TTG	PN, CTS, Heart	USA, Italy
Val30Gly	- GGG	LM, Eye	USA	Phe64Ser	- ATT		Canada, UK
Val32Ala	- GCG	PN, AN, Heart	Singapore (Chinese)	Gly67Arg	- TCT	LM, PN, Eye	USA
Val32Gly	- GGG	PN, AN	France	Gly67Glu	GGG - AGG	Eye, PN	USA
Phe33Ile	TTC - ATC	PN, Eye	Israel	Ile68Leu	GGG - GAG	Heart, PN	Chinese
Phe33Leu	- CTC	PN, Heart	USA	Tyr69His	ATA - TTA	Heart	Germany
Phe33Val	- GTC	PN, Eye	UK, Japan, China	Tyr69Ile	TAC - CAC	Eye, LM	Canada, USA, Sweden
Phe33Cys	- TGC	CTS, Heart, Eye, Kidney	USA	Lys70Asn	- ATC**	Heart, CTS, AN	Japan
Arg34Ser	AGA - AGC/T	PN, Heart	USA	Val71Ala	AAA - AAC	Eye, CTS, PN	USA
Arg34Thr	- ACA	PN, Heart	Italy	Ile73Val	GTG - GCG	PN, Eye, CTS	France, Spain
Arg34Gly	- GGA	Eye	UK (Kosovo)	Thr75Ile	ATA - GTA	PN, AN	Bangladesh
Lys35Asn	AAG - AAC	PN, AN, Heart	France	Ser77Tyr	ACC - ATC	Heart	France
Lys35Thr	- ACG	Eye	USA	Ser77Phe	TCT - TAT	Kidney	USA (IL, TX), France
Ala36Pro	GCT - CCT	Eye, CTS	USA	Tyr78Phe	- TTT	PN, AN, Heart	France
Asp38Ala	GAT - GCT	PN, Heart	Japan	Ala81Thr	TAC - TTC	PN, CTS, Skin	France
Asp38Val	- GTT	PN, Heart	Guiana	Ala81Val	GCA - ACA	Heart	USA
Asp39Val	GAC - GTC	Heart	Germany	Ile84Ser	- GTA	Heart	Russia, Poland
Thr40Asn			Germany	Ile84Asn	ATC - AGC	Heart, CTS, Eye	USA (IN), Hungary (FAP II)
Trp41Leu	TGG - TTG	Eye, PN	USA	Ile84Thr	- AAC	Heart, Eye	USA
Glu42Gly	GAG - GGG	PN, AN, Heart	Japan, USA, Russia	His88Arg	- ACC	Heart, PN	Germany, UK
Glu42Asp	- GAT	Heart	France	Glu89Gln	CAT - CGT	Heart	Sweden
Phe44Ser	TTT - TCT	PN, AN, Heart	USA	Glu89Lys	GAG - CAG	PN, Heart	Italy
Phe44Tyr	- TAT	PN, AN	France	His90Asp	- AAG	PN, Heart	USA
Phe44Leu	TTT - CTT	Heart	Caucasian	Ala91Ser	CAT - GAT	Heart	UK
Ala45Thr	GCC - ACC	Heart	USA	Glu92Lys	GCA - TCA	PN, CTS, Heart	France
Ala45Asp	- GAC	Heart, PN	USA	Val93Met	GAG - AAG	Heart	Japan
Ala45Ser	- TCC	Heart	Sweden	Val94Ala	GTG - ATG	PN	UK
Ala45Val	- GTC		France	Ala97Gly	GTA - GCA	Heart, PN, AN, Kidney	Germany, USA
Gly47Arg	GGG - CGG/AGG	PN, AN	Japan	Ala97Ser	GCC - GGC	Heart, PN	Japan
Gly47Ala	- GCG	Heart, AN	Italy, France	Arg103Ser	- TCC	PN, Heart	Taiwan, USA
Gly47Val	- GTG	CTS, PN, AN, Heart	Sri Lanka	Ile107Val	CGC - AGC	Heart	USA
Gly47Glu	- GAG	Heart, PN, AN	Turkey, USA, Germany	Ile107Met	ATT - GTT	Heart, CTS, PN	USA
Thr49Ala	ACC - GCC	Heart, CTS	France, Italy	Ile107Phe	- ATG	PN, Heart	Germany
Thr49Ile	- ATC	PN, Heart	Japan, Spain	Ala109Ser	- TTT	PN, AN	UK
Thr49Pro	- CCC	Heart, PN	USA	Leu111Met	GCC - TCC	PN, AN	Japan
Thr49Ser	- AGC	PN	India	Ser112Ile	CTG - ATG	Heart	Denmark
Ser50Arg	AGT - AGG	AN, PN	Japan, France/Italy, USA	Tyr114Cys	AGC - ATC	PN, Heart	Italy
Ser50Ile	- ATT	Heart, PN, AN	Japan	Tyr114His	TAC - TGC	PN, AN, Eye, LM	Japan, USA
Glu51Gly	GAG - GGG	Heart	USA	Tyr116Ser	- CAC	CTS, Skin	Japan
Ser52Pro	TCT - CCT	PN, AN, Heart, Kidney	UK	Ala120Ser	TAT - TCT	PN, CTS, AN	France
Gly53Glu	GGA - GAA	LM, Heart	Basque, Sweden	Ala120Thr	GCT - TCT	Heart	Afro-Caribbean
Gly53Ala	- GCA	PN, AN, Heart, Eye, LM	UK	Val122Ile	- ACT	PN, CTS	Japan
Gly53Arg	- AGA	LM	USA	ΔVal122	GTG - ATC	Heart	USA
Glu54Gly	GAG - GGG	PN, AN, Eye	UK	Val122Ala	- ΔAA	Heart, PN	USA (Ecuador), Spain
Glu54Leu	- TTG	Heart	Belgium		- GCC	Heart, Eye, PN	USA
Glu54Lys	- AAG	PN, AN, Heart, Eye	Japan				

* = CLINICAL FEATURES: AN = Autonomic Neuropathy; CTS = Carpal Tunnel Syndrome; Eye = Vitreous Deposits; LM = Leptomenigeal; PN = Peripheral Neuropathy; ** = Double Nucleotide Substitution

Patients, Families, Amyloid Support Groups

Important Facts

- 1. Need to know type of Amyloidosis: ATTR, AFIB, AAPOA1, AAPOA2, ALYS, AGEL, ALECT2.**
- 2. Need to know mutation. Example: VAL30MET**
- 3. Clinical variations associated with your mutation**

Communication















