

Release Notes 2022-02-14 : I extracted the ideas and experience I had from the related scientific literature (and feeding the dogs) to the following recipes that I thought were important. References are mostly to product sites rather than supporting literature which has been discussed previously. I am not a vet or a doctor and this work is intended for limited circulation at this point. **This is a draft and has not been peer reviewed or completely proof read but released in some state where it seems worthwhile given time or other constraints. For information only, not for use for any particular purpose see fuller disclaimers in the text. Caveat Emptor.**

Initial Vitamin Combinations Possibly Useful in Old Age

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I have condensed by experience feeding dogs and ideas from the scientific literature into a few pages that highlight what I think are the most important parts for older people.

1. INTRODUCTION

The general theory behind this work is that many nutrients are limited due to chronic intake and uptake issues. Correcting a single one may not show significant benefit or it may even be detrimental as in re-feeding problems. However, a few may be higher priority. Notably, essential amino acids and SMVT substrates. Uptake may be limited by many issues including digestion and transporter function. Supplementation of free, non-competing vitamins may be of benefit especially when combined with solubility enhancers.

These ideas are abstracted from recent and decades old literature as well as my experiences feeding dogs various vitamins. However, only some product suggestions are cited here. Note that links to specific products are for "illustration only". These are related to products I have used in the past but may not be suitable for all uses or for dogs or other animals.

2. THE RECIPES

Generally the literature on amino acids points to essentials plus tyrosine and arginine as being more likely to work than broader supplements or the distribution found in most foods.

Likely all essential amino acids are worth supplementing but the hydrophobic neurotransmitter precursors may be the most relevant. In particular tryptophan has a central role in many processes and is likely to be depleted.

The adult healthy "normal" human RDA for tryptophan is around 250-400mg/day. However, the presumption is that uptake as well as digestion are impaired and increasing this amount by a significant factor would not be unreasonable although 400mg/day may be a good starting point.

Two uptake enhancers are considered: lecithin and calcium pantothenate. Lecithin is a well known emulsifier and may contribute choline which itself is useful. Pantothenate may be less appreciated but is also an SMVT substrate of potential importance although requiring calcium for stabilization. Calcium intake and uptake are also concerns but for the short term additional intake may be tolerable especially with reduced vitamin D and eventually with added vitamin K.

I have had been mixing calcium pantothenate, lecithin, and various amino acids (tryptophan, tyrosine, etc) in approximately equal volumes. I did note the tryptophan density could vary significantly between 400 to 800 mg/quarter teaspoon depending on details of the formulation even from the same manufacturer. I combine about 400mg tryptophan with 1/4 tsp of sunflower lecithin and 1/8 tsp of calcium pantothenate powder when making a larger snack for the dogs. When making it for myself, I may omit lecithin if not available and add it to coffee or diet coke. It is easy to observe the solubility issue by trying to add tryptophan powder to water. It can be very difficult to get it to wet, it just floats on top. Adding extra virgin olive oil will "soak it up" as the powder appears to segregate into the oil. The pantothenate appears to allow the water and oil to emulsify somewhat presumably aiding absorption. I

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also just add taurine routinely although not sure it is necessary. Calcium intake needs to be controlled but for now the additional amount with the pantothenate is probably not a big deal.

Tyrosine is another potential issue with similar solubility problems as well as stability issues. 400mg mixed in with the tryptophan would probably be ok. Tyrosine ideally should not be given with copper or anything reactive and it can compete for transporters..

SMVT substrates, notably pantothenate and biotin, sometimes come up in the literature. These may compete but in places may be obtained by non-saturating diffusion. Rotating large amounts may be helpful in case of transporter limited bottlenecks.

The first recipe then, suggested for morning, is based around tryptophan and tyrosine.

Morning mix		
Ingredient	Mass	likely volume estimate
Tryptophan[8][1]	500mg	1/8 - 1/4 tsp
Tyrosine [9] [2]	400mg	1/4 tsp
calcium pantothenate [12]	500mg	1/8 tsp
Arginine	500 mg	1/4 tsp
Taurine [11]	900 mg	1/4 tsp
sunflower lecithin [3]	900mg	1/4 tsp
extravirgin olive oil		a few drops
water/aqueous carrier		a as needed

TABLE I:

Normally I give the tryptophan alone and include tyrosine in the afternoon (along with phenylalanine and others) but it may benefit from the pantothenate in the morning recipe. The pantothenate competes with biotin for the SMVT and they should not be given at the same time.

Afternoon		
Ingredient	Mass	likely volume estimate
Tyrosine ^a	500mg	1/4 tsp
Histidine[14] [7]	500mg	1/4 tsp
Taurine	900 mg	1/4 tsp
lecithin	900mg	1/4 tsp
biotin [10]	10mg	1/128-1/64 tsp

^a unless included in morning

TABLE II:

Normally when I feed the dogs, I measure each component by volume with kitchen measures and measure the density from time to time (the collection software MUQED allows conversion to metric masses for reporting) . Commercially available mixed amino acids don't seem to list component amounts but that should be ok here. As several components are hydrophobic, an emulsifier such as lecithin may help. The Bulk Supplements mixed EAA product referenced here contained lecithin the last time I checked.

With the dogs I need to be careful about specific components but probably any decent multi-B vitamin would be helpful at least once every few days.

I also think that metals and vitamin K , among several others, will be important but those may not be needed right away to see any results. When I'm feeding the dogs, I always add citric acid and potassium chloride and both may be important for digestion and nutrition.

Evening		
Ingredient	Mass	likely volume estimate
Mixed EAA [5]		1 tsp
multi B [4]		.5 -1 or so
Taurine	900 mg	1/4 tsp
lecithin	900mg	1/4 tsp

TABLE III:

Miscellaneous		
Ingredient	Mass	likely volume estimate
Citric acid		1/4 tsp
KCl		
extra virgin olive oil		
copper	5mg	
zinc	10-20mg ?	
K1 [13]	10-20mg	
K2 [6]	10-20mg	

TABLE IV:

3. CONCLUSIONS

This outlines my minimal approach to supplements for older people or dogs.

4. SUPPLEMENTAL INFORMATION

4.1. Computer Code

5. BIBLIOGRAPHY

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1. Pubmed eutils facilities and the basic research it provides.
2. Free software including Linux, R, LaTeX etc.
3. Thanks everyone who contributed incidental support.

Appendix A: Statement of Conflicts

No specific funding was used in this effort and there are no relationships with others that could create a conflict of interest. I would like to develop these ideas further and have obvious bias towards making them appear successful. Barbara Cade, the dog owner, has worked in the pet food industry but this does not likely create a conflict. We have no interest in the makers of any of the products named in this work.

Appendix B: About the Authors and Facility

This work was performed at a dog rescue run by Barbara Cade and housed in rural Georgia. The author of this report ,Mike Marchywka, has a background in electrical engineering and has done extensive research using free online literature sources. I hope to find additional people interested in critically examining the results and verify that they can be reproduced effectively to treat other dogs.

Appendix C: Symbols, Abbreviations and Colloquialisms

TERM definition and meaning

Appendix D: General caveats and disclaimer

This document was created in the hope it will be interesting to someone including me by providing information about some topic that may include personal experience or a literature review or description of a speculative theory or idea. There is no assurance that the content of this work will be useful for any particular purpose.

All statements in this document were true to the best of my knowledge at the time they were made and every attempt is made to assure they are not misleading or confusing. However, information provided by others and observations that can be manipulated by unknown causes ("gaslighting") may be misleading. Any use of this information should be preceded by validation including replication where feasible. Errors may enter into the final work at every step from conception and research to final editing.

Documents labelled "NOTES" or "not public" contain substantial informal or speculative content that may be terse and poorly edited or even sarcastic or profane. Documents labelled as "public" have generally been edited to be more coherent but probably have not been reviewed or proof read.

Generally non-public documents are labelled as such to avoid confusion and embarrassment and should be read with that understanding.

Appendix E: Citing this as a tech report or white paper

Note: This is mostly manually entered and not assured to be error free.
This is tech report MJM-2022-007.

Version	Date	Comments
0.01	2022-02-12	Create from empty.tex template
1.0	2022-02-14	Distributed
-	February 14, 2022	version 1.0 MJM-2022-007
1.0	20xx-xx-xx	First revision for distribution

Released versions,
build script needs to include empty releases.tex

Version	Date	URL
1.00	2022-02-14	none, email

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Supporting files. Note that some dates,sizes, and md5's will change as this is rebuilt.

This really needs to include the data analysis code but right now it is auto generated picking up things from prior build in many cases

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