# Healthy body, sound mind?

“Many neurological disorders—Huntington’s, Parkinson’s, Alzheimer’s disease, and even autism spectrum disorders—are often paired with metabolic and endocrine alterations,” explained Bronwen Martin, Ph.D. Type 2 diabetes, for example, is associated with an increased risk for developing Alzheimer’s Disease. My belief is that if we can understand this dysfunction and correct it, we can ultimately improve brain health.

Martin is not alone in her conviction. As a post-doctoral fellow with Mark Mattson, Ph.D at the National Institute on Aging (NIA), Martin was funded by the Huntington’s Disease Society of America (HDSA) to investigate novel endocrine related strategies for the treatment of Huntington’s disease. In collaboration with Josephine Egan MD, Martin was able to show improvements in a mouse model of Huntington’s Disease by administering a long acting form of the gut hormone, Glucagon-Like-Peptide-1 (GLP-1). GLP-1causes the release of insulin by the pancreas and also reaches the brain to exert neuro-protective effects. Martin subsequently extended her findings to mouse models of other neurological disorders.

## Extendin-4 clinical trials

The GLP-1 receptor agonist that Martin used, “Extendin-4”, is already prescribed as “Byetta,” an FDA approved drug for type 2 diabetes. As a result of basic studies carried out within the Intramural Research Program (IRM), including Martin’s studies, the NIA is beginning clinical trials testing the safety, efficacy, and side effects of daily Extendin-4 treatment in patients with early stage Alzheimer’s disease or mild cognitive impairment in participants aged 65 and over.

Now a principal investigator, Martin remains interested in identifying novel metabolic and endocrinal approaches to improve the quality of life for people with aging-related cognitive decline. But she is most excited about making a difference before problems arise by detecting and acting on the earliest signs of metabolic dysfunction.

## The Baltimore study of aging

Martin considers herself fortunate to have access to a unique, NIA-funded study, the Baltimore Longitudinal Study of Aging (BLSA). Beginning since 1958, the BLSA has been America’s longest running scientific study of aging. Hundreds of patients come back every two to four years. “Some of our subjects are now in their 90’s,” said Martin. Volunteers are evaluated for physical and cognitive health through a variety of tests ranging from questionnaires and brain imaging to blood workups.

Using samples from the BLSA, Martin and her team are searching for patterns of biomarkers correlated with neurological and metabolic dysfunction. “We can do a whole range of -omics analyses: genomics, proteomics, metabolomics,” cited Martin. Her laboratory has the technology at hand to look at literally tens of thousands of molecules that cut across all the organs and systems involved in maintaining metabolic function during aging. “With 50 to 100 patients we should have enough data to start seeing patterns.”

“One challenge we came across fairly early was how to put all this information together,” said Martin. She pointed out that for example in genome-wide association studies, investigators are often faced with large data sets containing thousands of different genomes. “You end up with these enormous spreadsheets with rows and rows of data—how on earth do you look for differences?” ­

### A three-dimensional software solution

Martin and her NHI collaborator Stuart Maudsley, Ph.D. have developed a potential solution to this problem in the form of a software suite called “Omnimorph.” Omnimorph takes extremely large experimental data sets like the ones Martin and Maudesly are generating and turns them into three-dimensional, graphical representations. “We can see differences among large data sets just by looking at the different shapes that Omnimorph creates,” said Martin.

Martin believes that this systems biology approach will offer new insights into both the control of metabolic function and how the controls are altered during aging and aging-related disorders. “Some people age well with good cardiovascular, metabolic, and cognitive health. Others don’t. We’re trying to understand and predict metabolic trajectories across a lifetime. If we can predict, we can try to prevent,” said Martin. “And prevention is better than cure.”

**Style Sheet:**

**Name:** Sahana Melkris

**Date:** June 10th, 2020

**Title of Document:** “Editing Exercise-Healthy Minds”

**Style Manual:**

**Microsoft Style Guide, 2018:**

*Pages referenced: “Hyphens,” “Capitalization,” “Apostrophes,” “Numbers,” “Commas,” and “Acronyms.”*

* For titles, we capitalize the first word and lower case the rest according to “Microsoft Style Guide > Capitalization.”
* I Added a hyphen for “aging-related” as per “Microsoft Style Guide > Punctuation > Dashes and Hyphens > Hyphens”. “Aging-related” modifies the noun “decline” in “cognitive decline” and contains participle “related,” so it needs a hyphen.
* I made numbers below 10 as words according to the “Microsoft Style Guide > Numbers”
* The full abbreviation of new acronym NHI is needed upon first use according to “Microsoft Style Guide > Acronyms.”
* I included the Oxford comma as part of “Microsoft style guide > Punctuation > Commas”. An Oxford comma is added before the conjunction “and” in a list of three or more items.
* I capitalized “Glucagon-Like-Peptide-1” as it’s a proper noun. Otherwise it is not necessary to capitalize the full abbreviation of an acronym according to “Microsoft Style Guide > Acronyms.”
* I took out the acronym (GWAS) for genome-wide association studies as the term is not used more than once, therefore is not necessary according to “Microsoft Style Guide > Acronyms."
* I added comma after “unique” in sentence “Martin considers herself fortunate to have access to a unique, NIA funded study” because when two or more adjectives precede a noun and adjectives order can be switched around, you can add commas after adjectives according to “Microsoft Style Guide > Punctuation > Commas.”

**The Chicago Manual of Style, 17th edition of text, 2017:**

*Pages referenced: “Sample page with parenthetical citations”*

For Chicago Style Manual, you will need year that the author Martin was quoted speaking.

**Dictionary:** New Oxford American Dictionary, 4th edition

* “disease” is lowercase when following “Alzheimer’s” according to New Oxford American Dictionary.
* “biomarker” is a non-hyphenated word according to New Oxford American Dictionary.
* I kept the term as “workups” as it does not have a hyphen in it as in “work-ups” according to New Oxford American Dictionary
* “Type 2 diabetes” doesn’t have a hyphen