Engineered bacteria for the conversion of amyloid plaques to dark chocolate
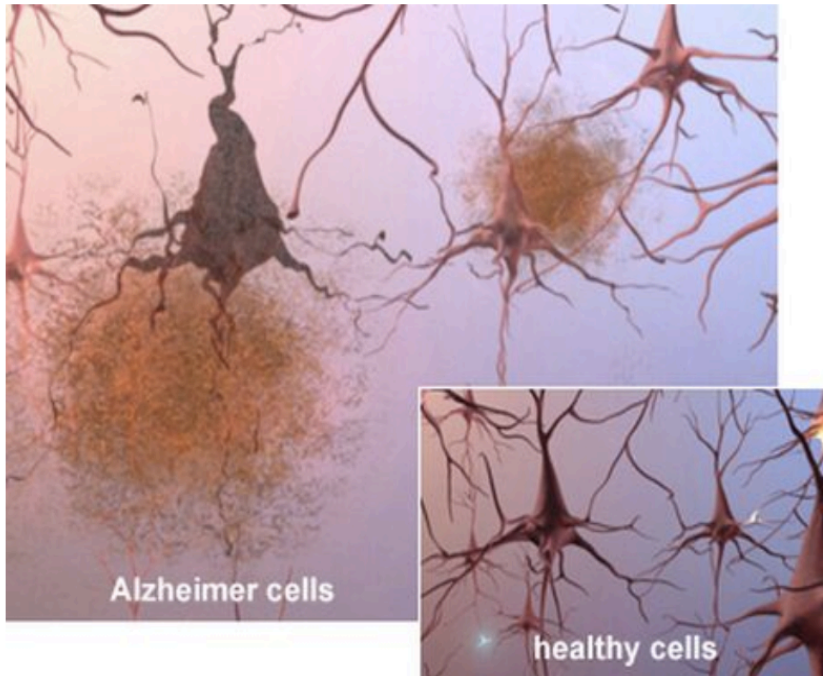
Shannon K. Hughes and Noreen L. Lyell

Alzheimer's affects 5.4 million Americans

- Information about disease and progression

Transition statement linking to β-amyloid plaques (written on slide and/or stated verbally)

β-amyloid plaques contribute to degeneration of nerve function

Alzheimer cells

healthy cells

- General information about plaque origin and structure
- Block cell-cell communication
- Induce apoptosis
- Lead to generalized destruction of brain tissue

Symptoms of Alzheimer's may be alleviated by elimination of plaques

- Information about current field of research
  - Briefly, what has been done

Though some progress has been made in reducing plaques, our aim is to convert them to usable product

Novel amyloid-to-dark chocolate (ADC) enzyme recently discovered

- Identified in our laboratory using a yeast two-hybrid screen
- Information about ADC enzyme

Research aim: use ADC to convert β-amyloid plaques to dark chocolate

- Goal 1: Optimize the production of genetically engineered ADC using non-toxic *E. coli* strain

- Goal 2: Determine enzymatic efficiency of engineered ADC *in vitro* using harvested β-amyloid plaques

- Goal 3: Measure efficacy of engineered ADC *in vivo* using a mouse model of Alzheimer's disease

Optimize production of ADC in *E. coli*

Goal #1

Beta-amyloid protein

Active Site

ADC
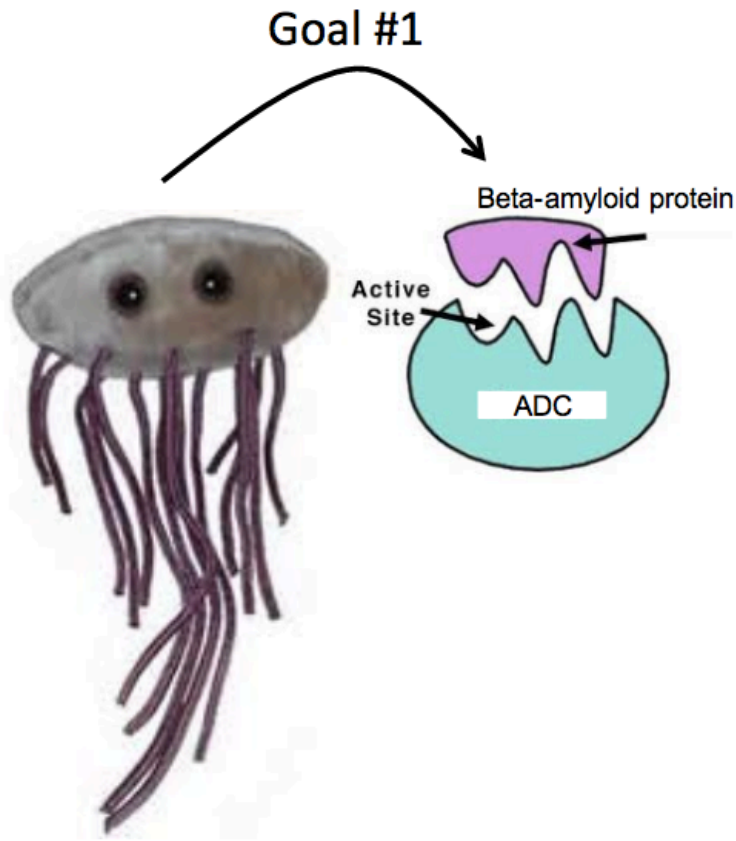
- Engineer BL21(DE3) to express ADC
  - Clone ADC into pXYZ
  - Test protein expression
  - Additional steps...
- Potential setback
  - Possible solution

Determine enzymatic efficiency of ADC using β-amyloid plaques

- Research goal
  - Steps…

- Potential setback
  - Possible solution
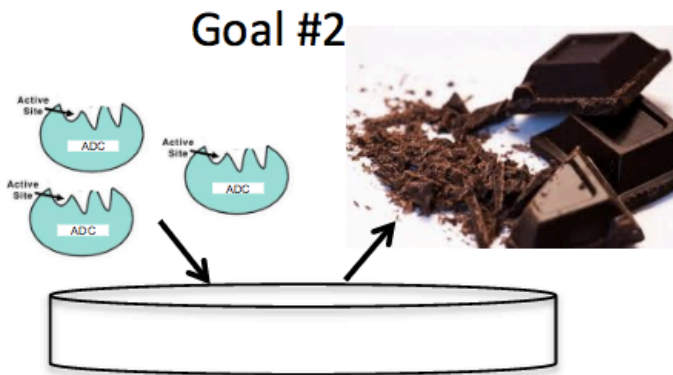
Measure efficacy of ADC *in vivo* using mouse model

- Research goal
  - Steps…
  - Potential setback
  - Possible solution

Goal #3

Include impact statement

- Include significance of your research as it relates to science and society

Conversion of β-amyloid plaques to usable product in treatment of Alzheimer's