

# RTD I: Nutrition 101

## Protein Requirements in Infectious Diseases *Including HIV Infection*

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# Body Background

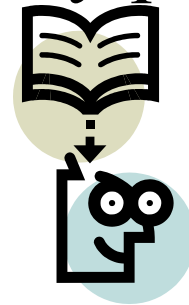
- The beauty of complexity
  - Functional protein is the “big city”
  - The body loves “status quo”
- The downsides of complexity
  - The body has a hierarchy of priorities
  - The body seeks to protect itself
  - The body seeks to preserve what is most important to survival

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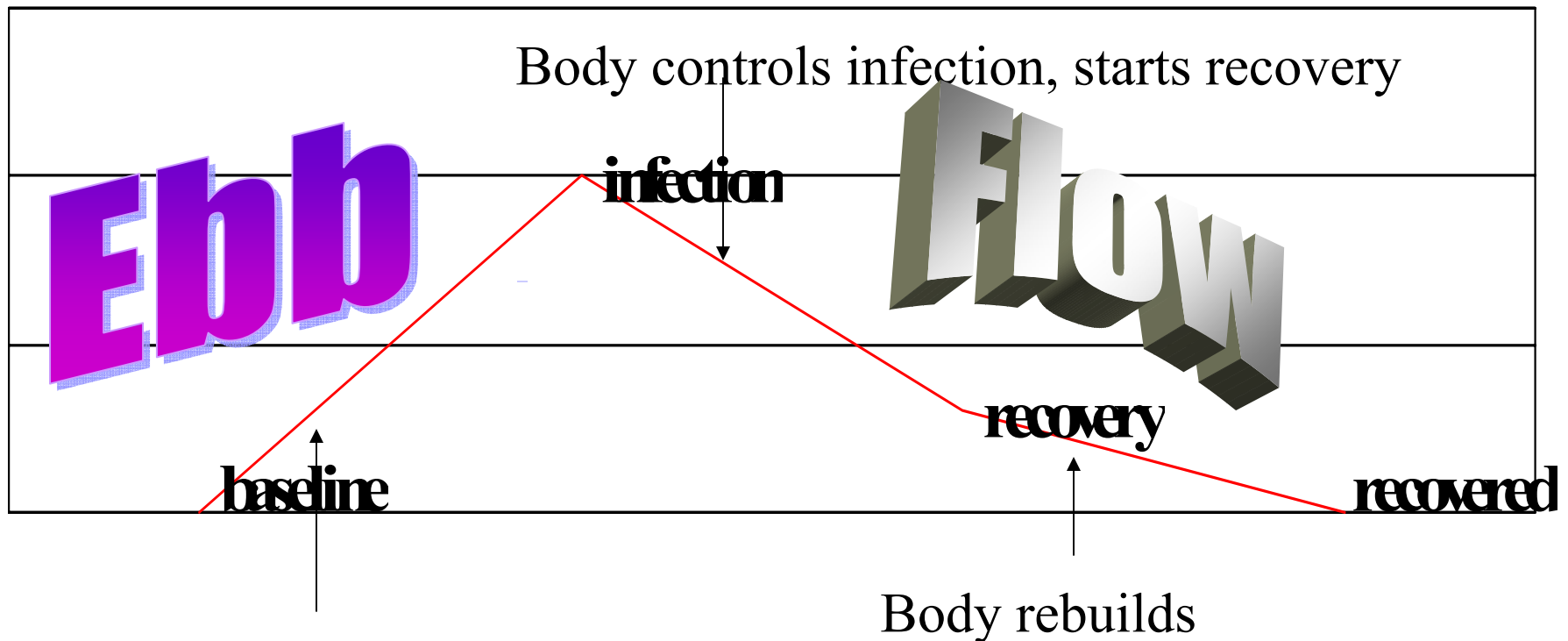
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# Protein Background

- Clarity: body proteins vs. dietary proteins
  - Dietary protein
    - Varying quality
    - Varying amounts in foods
    - Variations in how the body uses dietary protein
  - Body proteins are in muscle, organs, bones, collagen, body fluids: all dynamic



# The “Scientific” View



Body starts response to infection: muscle breakdown



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# Mr. Ebb and Ms. Flow

- “Mr. Ebb”
  - Men say, “GRRR!!!”
  - Women say, “Oh nooooo!!!”
- Ms. Flow
  - Women click and tap your pens/pencils
  - Men softly say, “aaahhhh...”

# Characters: The Good Guys



- Mr. Ebb – war mongering, trigger happy, extremely organized and destructive; tears apart body protein to build response according to the enemy presence; most effective in well-nourished body; generally a good guy, but can turn bad if left unchecked
- Ms. Flow – equally determined to do her job of clean-up and rebuilding after war; most effective with a high-quality balanced diet

# Characters: The Bad Guys



- Ms. Malaria is the annoying cousin who easily stopped with simple protections; she likes to visit often, which allows her friends a better chance to get their foot in the door

Wanted: body to infect with malaria; pref body w/undernut; will prov ST misery & occ fut visits for prog wasting body pro; impact dep on prev exp & recov

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# Characters: The Bad Guys

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- Known mostly as Mr. TB, he is also stopped with precautions and good treatment; he leaves a path of wasting where he goes and can be resistant to treatment if you don't get it right the first time

Wanted: body to infect with TB; pref body w/prev exp & poor recov outcome; will prov excel source of misery; wasting dep on curr nutr & diet; resist strains avail.

# Characters: The Bad Guys

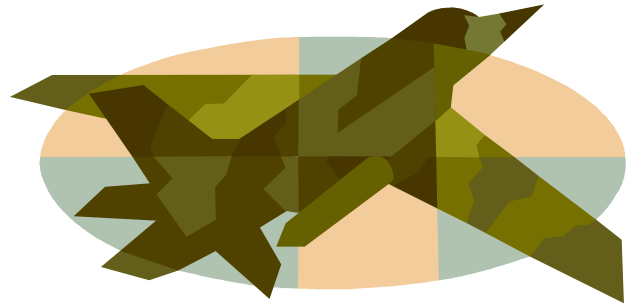
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- Mr. HIV is pretty weak guy really, but one with staying power. He constantly keeps Mr. Ebb busy providing daily skirmishes and wars. Some are big and some are slow... but they are constant. He tries to keep Ms. Flow out altogether, but even when she sneaks in with treatment, Mr. HIV specializes in special effects on stage through his ability to work undercover to support appearances by other chronic characters.

# Want Ads for Infection

- Wanted: body to infect w/HIV; pref undernour w/poor food/health acc; will prov life-long health prob, incl  $\uparrow$  risk death; daily pro breakdown incl for life.





## Mr. Ebb

- This is WAR! Mr. Ebb can't be bothered with concern for recovery.
- His job is to react and over-react to get the job done, sir!! Bring in the reserves!!
- The best diet can do here is stabilize the situation and secure the perimeter.

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# Ms. Flow

- Slowly sneaks in as Mr. Ebb is finishing up.
- Regroups to clean up and restore the messy battlefield (the body).
- Ms. Flow is a nurturing lady and recovery is her mission.



# Protein for Mr. Ebb

- Dietary protein can provide some of the needed materials for body protection and response to infection to limit the breakdown of protein tissues that lead to wasting.
- Adequate supply of body and dietary protein gives Mr. Ebb the ammunition he needs to “stem the tide” quickly with fewer casualties

# Protein for Ms. Flow

- Dietary protein can be used to rebuild the body's lost protein reserves (muscle, mostly)
- Rebuilding process is fairly well complete if the infection is short-term or non-recurring
- Rebuilding might be incomplete and need continuous protein support in undertreated, chronic, or recurring infection

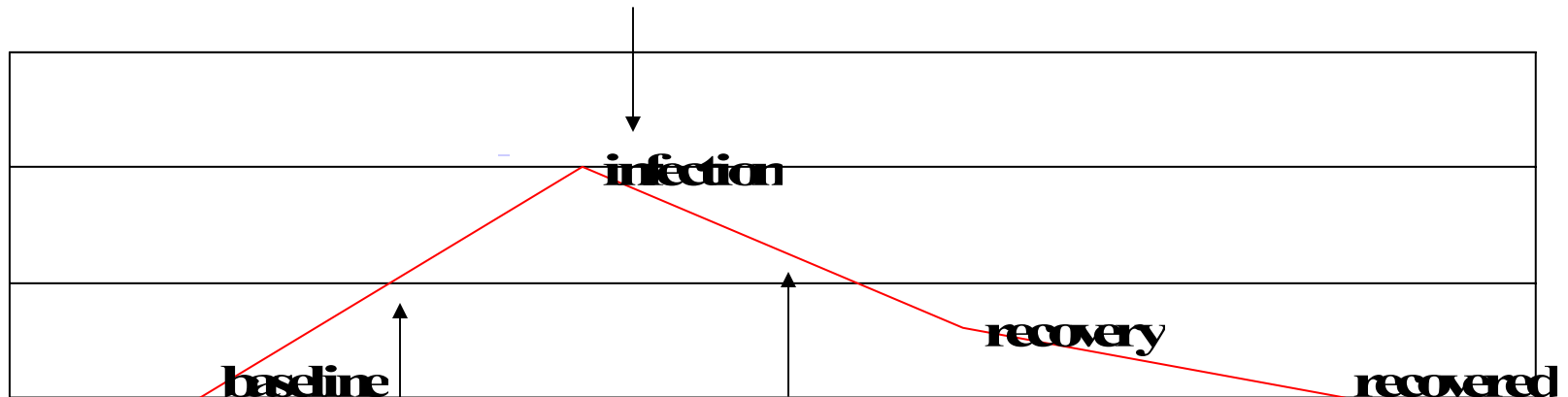
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# The Character View

Mr. Ebb turns the tide

Ms. Flow enters



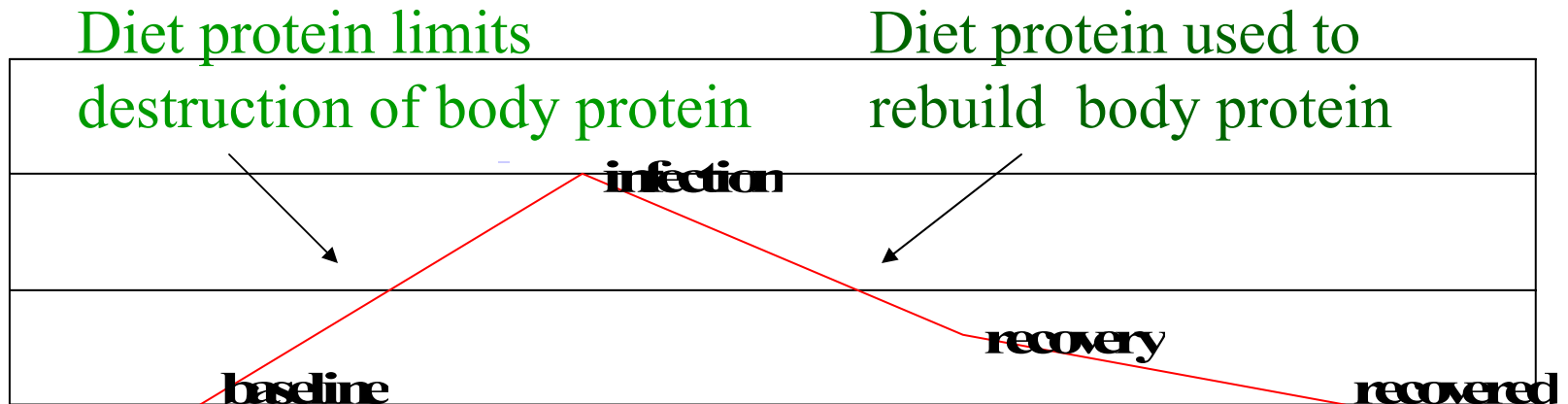
Mr. Ebb goes to war

Ms. Flow rebuilds

Enter Mr./Ms.  
Infection

# The Protein View:

*(Place Mr. Ebb and Ms. Flow where they should go)*



Body protein  
broken down to  
resist infection

Body protein

recovers **WISHH**

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# Protein Info Fill-Up



- Quality matters
  - Quality protein gives the defensive armor-piercing bullets needed by Mr. Ebb and the tools for Ms. Flow to rebuild
  - Lower quality protein may yield more of a “nerf” response by Mr. Ebb and delay Ms. Flow’s return

# Protein in Infectious Diseases

- Ebb:
  - Body protein used to “fight the good fight”
  - Dietary protein blunts the damaging response
  - Amount used is according to severity
- Flow:
  - Diet protein used to rebuild and recover
  - More is needed if there is a deficit

# Final Notes

- What about WHO consultation paper?
  - Balance vs. needs?
- What about social and economic feasibility and sustainability?



- It all fits in!



To fight  
the fight:  
food is  
king!

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# Infection

- Enter the “bug”!
  - Well-nourished body has lots of protein stores to “mount immune response” (call in the Calvary)
  - Depleted body gets run over with no recourse
- The body’s response
  - Inflammation
  - Break down of protein
  - Loss of appetite

# Infection Projection

- Short-term for well nourished:
  - Rest, fluids, take two, call me!
- Short-term for undernourished
  - The ride is a longer one, the symptoms hiding
- Long-term for well-nourished
  - Daily challenges and blunting process
- Long-term for undernourished
  - Catching up + daily challenges + blunting process in slower motion

# Chemical Details

- Infection → triggers body protein break down
- Body proteins provide chemical messengers and other stuff for protection
- The amount of protein broken down is related to what you start with and infection severity

# Manipulating the Course

- See the symptoms and diagnose the infection
- Provide medications (where effective)
- Limit the damage of wasting and other cell damage problems
  - HOW CAN WE DO THIS?