Nutrition in MPN

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MPN is a chronic inflammatory condition
Inflammation’s impact in MPN

Adapted from Craver et al, 2018
Inflammation as a driver of expansion of the $JAK2^{V617F}$ clone in MPN

$JAK2^{V617F}$ HSC are resistant to inflammation

$JAK2^{WT}$ HSC are vulnerable

$JAK2^{V617F}$ HSC have a selective advantage

$JAK2^{V617F}$ cells induce inflammation further promoting their selective advantage

= Inflammation
• Low risk
• Low cost
• Reduce inflammation
Using diet to manage MPN

Using “medicinal” properties of foods
Using diet to manage MPN

Using “medicinal” properties of foods
Using diet to manage MPN

Using “medicinal” properties of foods

Nutrition as way to optimize health
Prevention and Healthy Lifestyle

- Should we focus on carbohydrates, fats and proteins?
  - Atkin’s diet (South Beach diet), Zone, Weight Watcher’s, Ornish, etc...
- Which is most important to cut out?
- QUALITY >> regular dieting
Adherence to a Mediterranean Diet and Survival in a Greek Population

Antonia Trichopoulou, M.D., Tina Costacou, Ph.D., Christina Bamia, Ph.D., and Dimitrios Trichopoulos, M.D.

- 22,000 Greek participants were followed closely to see how their diet influenced their risk of coronary disease and cancer
- Diet was scaled on a Mediterranean diet score: 0-9
Anti-inflammatory diet: Mediterranean Diet

- The Mediterranean diet has proven to be beneficial in metabolic diseases, which are characterized by chronic subclinical inflammation.
Mediterranean Diet Reduced Cardiovascular Events

- PREDIMED Trial (Prevención con Dieta Mediterránea)
Mediterranean Diet - What is it?

A food pattern shared by countries around the Mediterranean Sea

- No specific rules or restrictions
- Focus on whole, plant foods and healthy fats
- Can use foods from many cultures (not just those around the Mediterranean)
The Mediterranean Pyramid

LESS: Red meat, sweets, processed foods

IN MODERATION: Lean protein such as fish and poultry, dairy, wine

MORE: Vegetables, greens, fruits, whole grains, beans, nuts, legumes

Also incorporate physical activity/exercise and enjoy meals with family and friends.

Image source: https://www.helpguide.org/articles/diets/the-mediterranean-diet.htm
## Mediterranean Eating Pattern Guidelines

<table>
<thead>
<tr>
<th>Category</th>
<th>Quantity</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vegetables</td>
<td>2-3 cups/day</td>
<td>Leafy greens, carrots, celery, peppers, squash, mushrooms, cauliflower</td>
</tr>
<tr>
<td>2. Legumes</td>
<td>2-3 servings/week</td>
<td>Beans, lentils, peas, chickpeas, snap beans, tofu</td>
</tr>
<tr>
<td>3. Fruits &amp; Nuts</td>
<td>1-2 servings/day</td>
<td>Whole fruit (including tomatoes, avocado), nuts (including salted nuts)</td>
</tr>
<tr>
<td>4. Whole Grains + Cereals</td>
<td>2-3 servings/day</td>
<td>Whole grain/whole wheat; corn/popcorn, brown/wild rice, corn tortillas, quinoa</td>
</tr>
<tr>
<td>5. Seafood</td>
<td>2-3 servings/week</td>
<td>Fatty fish, shrimp, clams, crabs, scallops, other lean fish (white fish)</td>
</tr>
</tbody>
</table>
Examples: Healthy Fats and Proteins

High in rich, unsaturated fats (liquid at room temperature)

- Olive oil, grapeseed oil, sesame oil
- Avocados, nuts, seeds, seafood
- May help lower bad cholesterol and raise good cholesterol

High in lean meats

- Salmon, tuna, and chicken
- Fish high in good fats
Can Diet Impact MPN?
Dietary Intervention Studies in MPN we’ve performed so far

Initial Pilot Study

- MED vs USDA diet
- 28 participants
- In person dietician counseling, weekly curriculum sent via email
- CBC, CMP, hsCRP, plasma cytokines, gut microbiome

E-intervention

- MED vs DASH diet
- 28 participants
- Zoom dietician counseling, written curriculum
**Initial Pilot Study Design**

**Enrollment**
- N=30

**2015-2020 Dietary guideline for Americans**
- N=15

**Week 1-2**
- Observe

**Week 3-12**
- Dietary intervention
  - Mediterranean diet
    - N=15

**Week 3, 5, 7**
- Dietician Counseling

**Week 3, 6**
- Provisions
  - Olive oil or grocery card

**Week 13-15**
- Follow-up

**Biological Samples**
- Week 1, 6, 9, 15
  - Blood draw
  - CBC, CMP, Lipid Panel, hsCRP
  - Plasma for cytokine analysis
  - Stool sample

**Surveys**
- Week 1, 2, 3, 6, 9, 12, 15
  - ASA24
  - Mediterranean diet adherence questionnaire
  - Feasibility questionnaire
  - Symptom surveys
Main point of study

Can MPN patients change their diet with dietician counseling and curriculum?
MPN patients can adopt a Mediterranean Diet
Impact of diet on MPN symptoms
Other things we measured in the study

- Blood counts
- Cholesterol
- hsCRP
- Inflammatory proteins in the blood
- Gut microbiome
Impact of Diet on Plasma Cytokines
E-intervention diet study design

- **Observation**: Enroll 30 participants
  - Mediterranean Diet N = 15
  - DASH DIET N = 15
- **Randomize**
- **Intervention**: 24 hour diet recall
  - Oral Symptom Surveys
  - Mucosal Transudate
  - Mediterranean diet adherence score
  - Zoom Dietician Counseling

Diagram shows the timeline for the study, with phases labeled Observation and Intervention.
Primary Objectives for e-intervention - Feasibility

- Symptom Survey Completion
- ASA24
- MEDAS
- Dietician Visits
Completion of MPN symptom surveys

A. Percentage of weeks that participants completed at least 5 surveys
B. Percentage of total surveys completed

Participants were sent daily texts or emails with a link to complete a symptom survey for 16 weeks (112 days)
Percent Change in MPN-TSS at Weeks 8 and 16 Versus Baseline

The baseline was calculated by taking the mean of MPN-TSS scores at week 2. Weeks 8 and 16 were calculated by taking the means of the scores from weeks 8 and 16.
Completion of Diet Surveys and Dietician Visits
Next Steps

• Develop much larger study utilizing an online curriculum to teach Mediterranean diet concepts, group classes, one on one dietician counseling
Acknowledgments

- Laura Mendez Luque
- Jerry Li
- Andy Odegaard
- Hellen Nguyen
- Jenny Nguyen
- Katrine Whiteson
- Julio Avelar-Barragan
- Michael Hoyt
- Robyn Scherber
- Ruben Mesa
- Heidi Kosiorek
- Amylou Dueck