The Relationship between Cytokines and Fatigue in Breast Cancer Survivors
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Introduction
- Fatigue is one of the most widely reported sequelae of breast cancer (BrCa).
- Previous studies have indicated a possible link between cytokines, intercellular protein signaling molecules, and cancer related fatigue.
- This study challenged a group of BrCa survivors mentally and physically and observed the activity of their cytokines in serum.

Purpose
To study the effect of mental and physical challenges on cytokine levels in the blood.

Methods
- Participants were randomized into 3 groups
  - A 6-minute walk/run test physically challenged Group 1
  - A computer interactive test challenged Group 2 mentally for 6 minutes
  - The control group was shown a 6 minute video
- Blood measures were taken at baseline, immediately after the task, and 30 minutes post-activity
- Proinflammatory Cytokines studied include eotaxin and interleukin-6
- Anti-inflammatory cytokines studied include interleukin-10 and interleukin-1ra

Results

<table>
<thead>
<tr>
<th>Participant Characteristics</th>
<th>N=46</th>
<th>Mean ± SD</th>
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</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>58.9 ± 9.1</td>
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<tr>
<td>Body Mass Index (kg/m²)</td>
<td>25.6 ± 5.0</td>
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<tr>
<td>Systolic Blood Pressure (mmHg)</td>
<td>114.72 ± 13.41</td>
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<tr>
<td>Diastolic Blood Pressure (mmHg)</td>
<td>71.17 ± 7.33</td>
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<tr>
<td>Time Since Last BrCa Treatment (years)</td>
<td>5.6 ± 4.9</td>
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Discussion
- The physical challenge induced a significant change in eotaxin immediately following exercise that was not seen in the mental challenge or control groups.
- Classically eotaxin is involved in allergic and asthmatic responses so it is unusual to see it increase with exercise.
- These results may be indicative of a mechanism contributing to inflammation causing fatigue due to exercise in breast cancer survivors.
- The non-statistically significant results in the other cytokines studied following the challenges could be due to differences in baseline levels, short intervention times, and a small sample size, which can be addressed in further studies.