## Differentiating between Primary and Secondary Sources in the Sciences

<table>
<thead>
<tr>
<th></th>
<th>Primary</th>
<th>Secondary</th>
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<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>Document that provides a full description of the original research, ideas, or scientific discoveries for the first time.</td>
<td>Document that summarizes, analyzes or discusses primary research on a particular topic.</td>
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<tr>
<td><strong>Includes</strong></td>
<td>Methods Section, Results Section, Tables, Figures and/or Graphs</td>
<td>May include Methods Section with description of literature review performed.</td>
</tr>
<tr>
<td><strong>Sample Keywords/Limiters</strong></td>
<td>Clinical Trial, Empirical Study, Quantitative Study, Qualitative Study</td>
<td>Review Article, Meta-Analysis, Systematic Review</td>
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### How to Identify a Primary Research Article

**The effect of herbal remedies on the production of human inflammatory and anti-inflammatory cytokines**

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**Abstract**

Background: Some herbal remedies are sold as food additives and are believed to have immune-enhancing properties.

**Objectives:** To study the effect of five herbal remedies - Sambucol Black Elderberry Extract, Sambucol Active Defense Formula and Sambucol for Kids (with known antiviral properties), Protec and Chizikut N (containing propolis and Echinacea, claimed to be immune enhancers) - on the production of cytokines, one of the main components of the immune system.

**Methods:** The production of four inflammatory cytokines (interleukin-1beta, interleukin-10) was tested using blood-derived monocytes from 12 healthy donors. The production of cytokines was measured using enzyme-linked immunosorbent assay (ELISA).

**Results:** The Sambucol preparations increased the production of cytokines, while Chizikut N caused a decrease in IL-1beta, TNalpha and IL-6 production. Lipopolysaccharide, a known activator of monocytes, induced the highest levels of cytokine production (3.6-10.7 fold).

**Conclusions:** The three Sambucol formulations activate the healthy immune system by increasing inflammatory and anti-inflammatory cytokines production, while the effect of Protec and Chizikut N is much less. Sambucol could therefore have immunostimulatory properties when administered to patients suffering from influenza (as shown before), or immunodepressed cancer or AIDS patients who are receiving chemotherapy or other treatments.

**Look for these HEADINGS in identifying a primary research article.**

**★METHODS section needs to describe how the research was performed using tests, surveys, and/or other instruments.**
Tip: Words in the title of an article like: meta-analysis, literature review, OR review can indicate to the reader, a secondary research article.

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