

# Analysis and Effectiveness of Natural Versus Over-The-Counter Pain Relievers



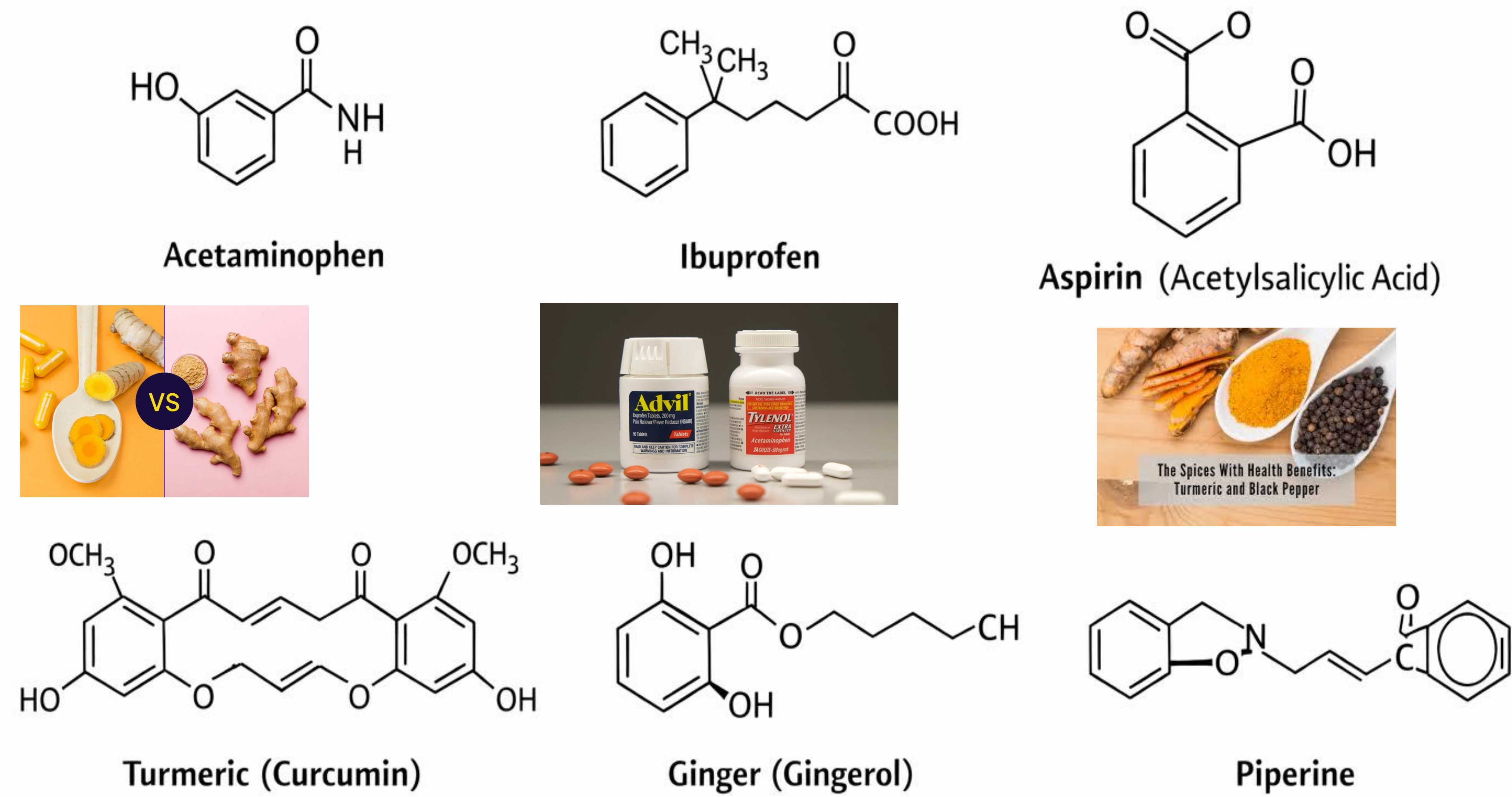
Blake Wolanin, Amel Garbou, PhD | Eastern Florida State College, Palm Bay, FL



## ABSTRACT

This experiment will compare the chemical composition of naturally-occurring and man-made painkillers. Ginger, ginger with black pepper, and turmeric will be compared to acetylsalicylic acid, acetaminophen and ibuprofen. Thin-layer chromatography (TLC) and high-performance liquid chromatography (HPLC) will be used to analyze these substances. Results from chromatography will be charted and compared. Absorption will also be predicted using hydrochloric acid to simulate conditions in a human stomach. Turmeric will be tested with and without black pepper as black pepper is known to inhibit the metabolism of turmeric, increasing absorption.

## CHEMICAL STRUCTURES



## INSTRUMENTATION



Picture: Angela Bovasso

## ACETAMINOPHEN CYCLE

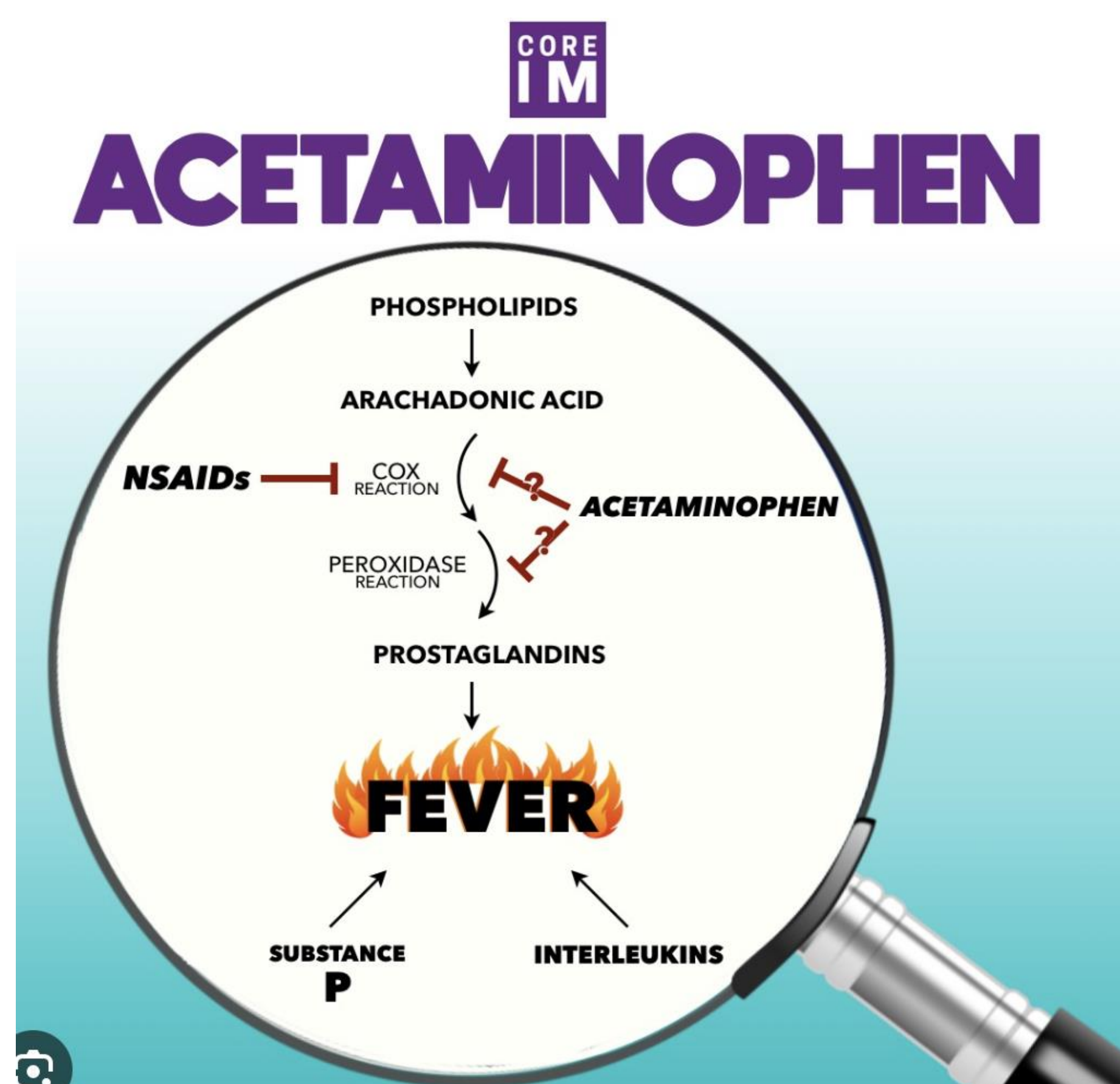


Photo: Clinical Correlations

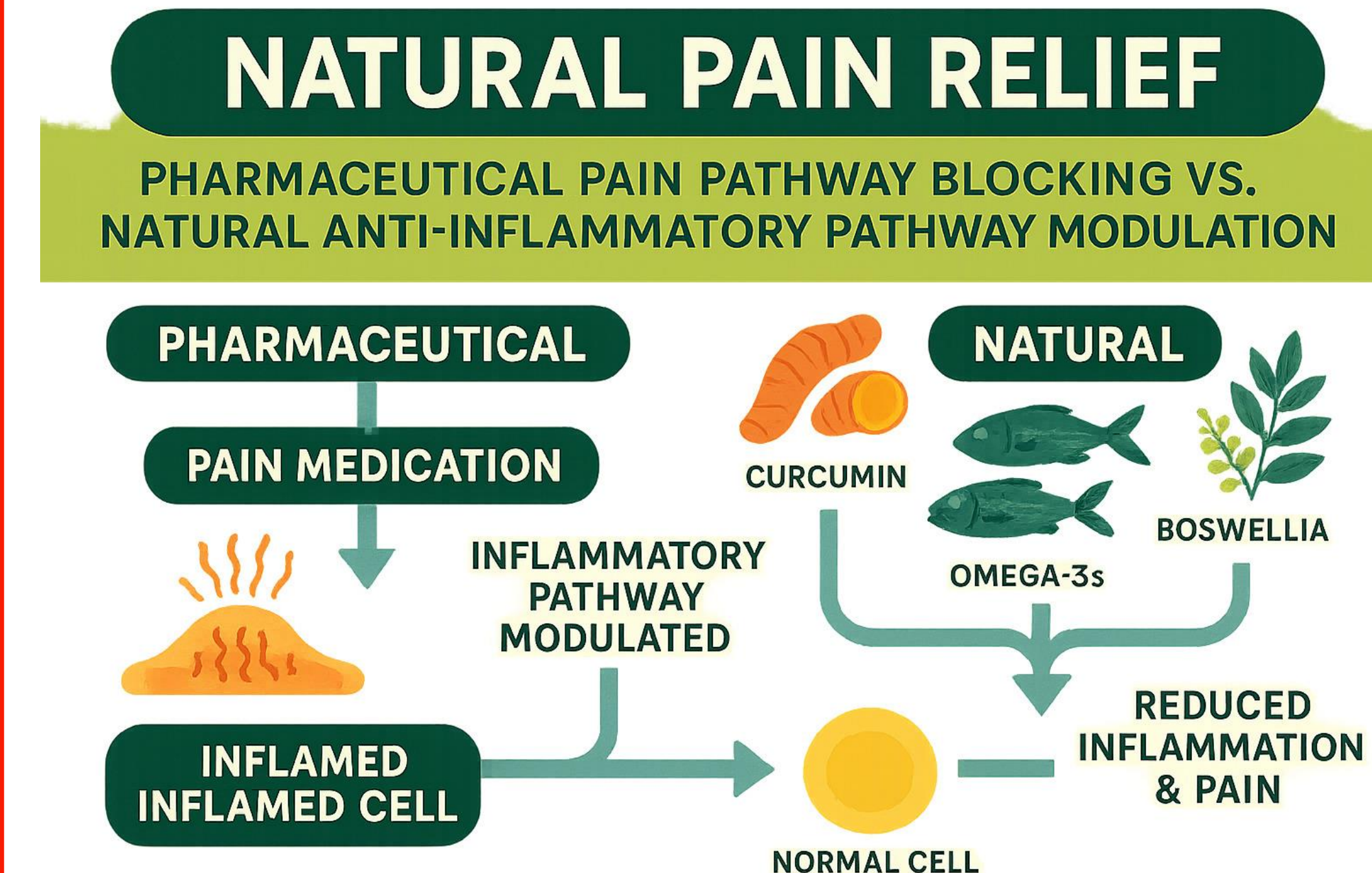
## SKILLS GAINED

- Preparing samples of painkillers
- Researching how these (natural and synthetic) painkillers work in the body
- Explaining varied effectiveness and absorption of turmeric versus turmeric with pepper
- Using HPLC and TLC
- Interpreting concentration results from chromatography

## EXPERIMENTAL

HPLC works to compare a compound's interaction with a stationary and mobile phase within the unit. A liquid sample is pumped through the unit, which includes a column with silica particles. Different chemicals interact with the column differently and thus separate and are detected using spectrometry. Concentration of each is then graphed.

## INFLAMMATION PATHWAYS



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