

Webinar Will Begin Momentarily

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Professional Education Series

Support. Inform. Educate. Empower.

Skin Health and Nutrition: Separating the Science from the Trends

TODAY'S AGENDA:

- Introduction & Housekeeping
- Speaker Introduction
- Presentation
- Q&A
- Closing



WEBINAR HOST:

Keith Hine, MS, RD

VP of Healthcare, Sports & Professional Education
Orgain, LLC



WEBINAR PRESENTER:

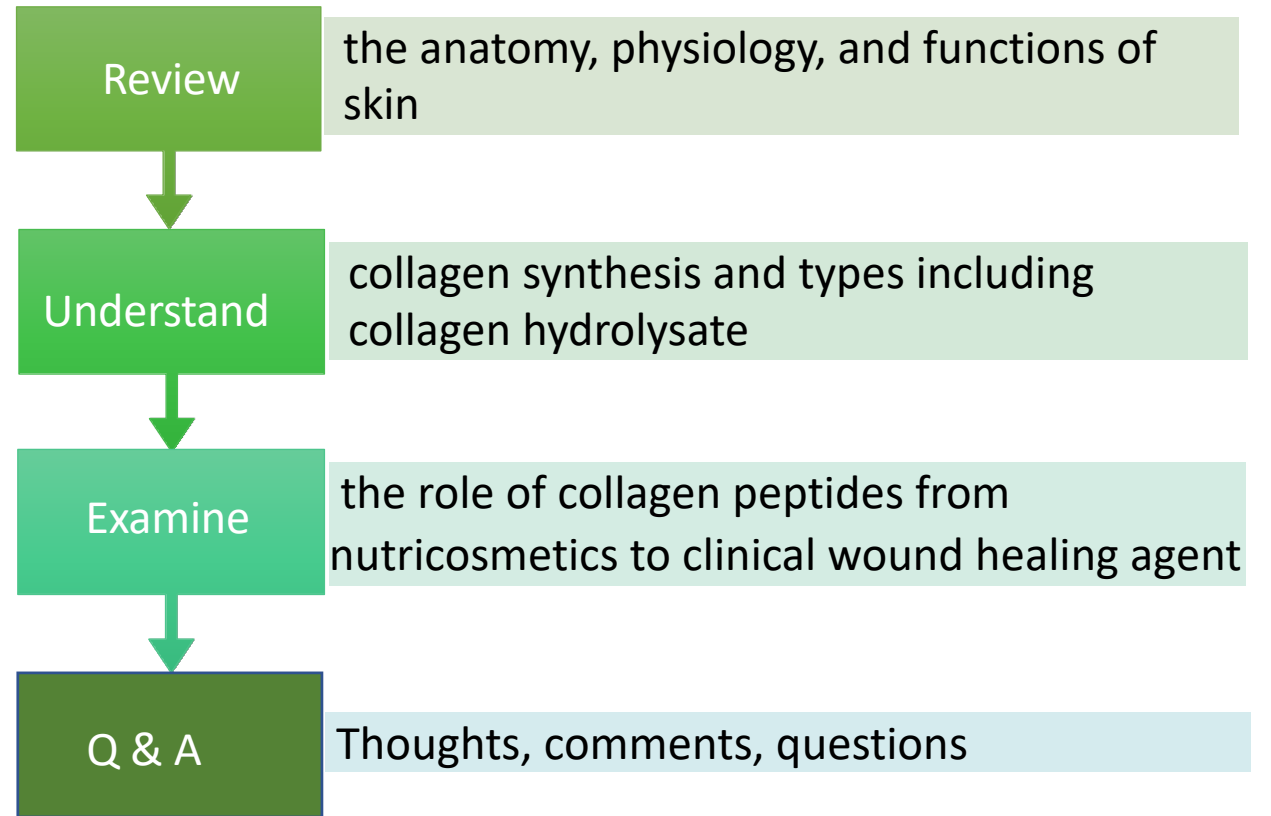
Nancy Collins, PhD, RDN, LD, NWCC, FAND

Nutrition Wound Care Certified dietitian (NWCC)
Light Bulb Health, Inc.
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Skin Concerns Over the Lifespan: Wrinkles to Wounds



Objectives/ Disclosures



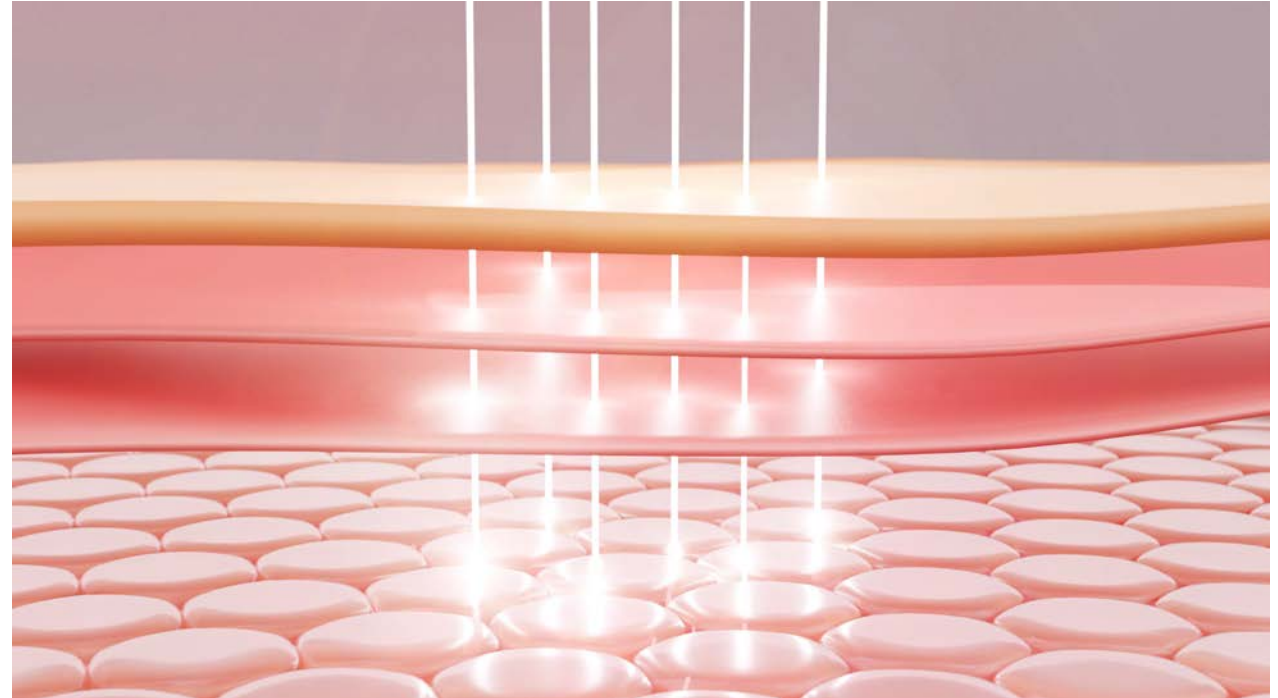
Disclosures:

Consultant, Speaker's Bureau – Medtrition, Abbott Nutrition, Nutricia

This webinar is sponsored by Orgain

Skin – Our Body's Coat

- Skin is our largest organ
 - adults carry about 8 pounds and 22 square feet of it
- Makes us look presentable
- Without it, we would literally evaporate

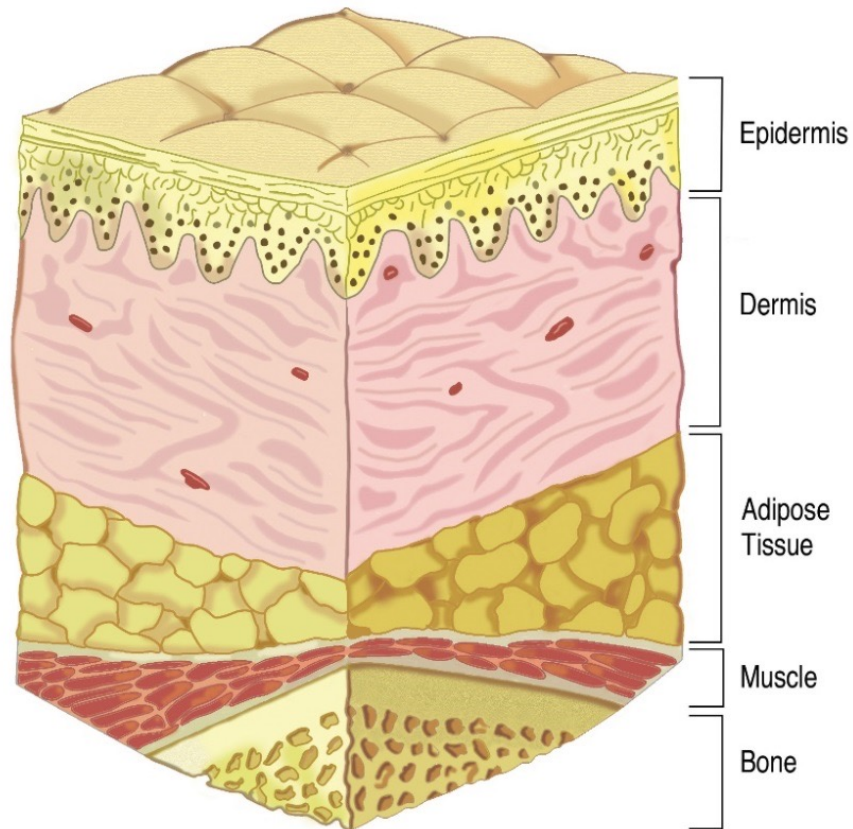


Functions of Skin



- Waterproofing
- Insulation and temperature regulation
- Manufactures vitamin D
- Sensor packed with nerves
 - Pain and pleasure
- Elastic and permits movement
- Protects against sunlight

The Layers of Skin



Epidermis – protective layer of dead cells

Dermis – sensation, temperature regulation

Subcutaneous – cushioning, insulation

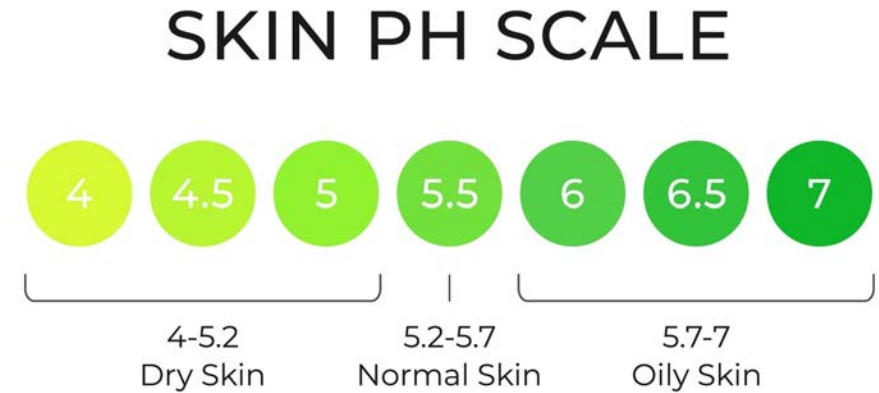
Microcirculation of the Skin

- **Arterioles** deliver oxygen, nutrients
- **Venules** carry away cellular waste
- External pressure occludes arterioles and venules
 - e.g., the kink in a garden hose



Skin Microbiome

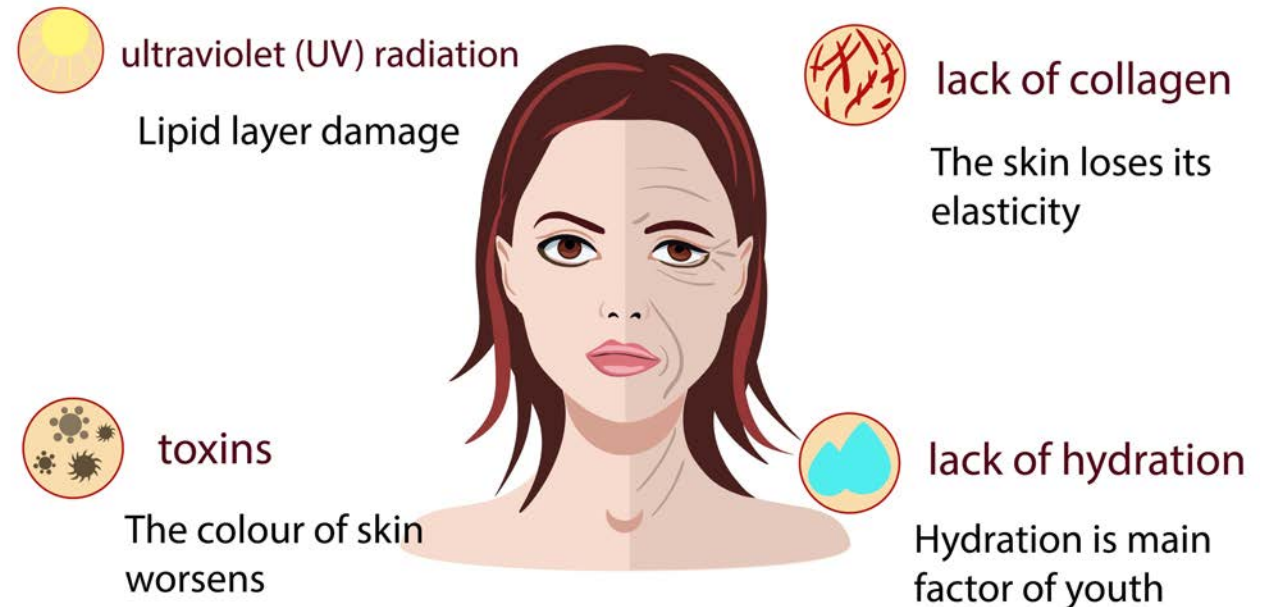
- Supports a diverse community of microorganisms that train and support the immune system
- Fends off pathogenic threats
- Extensive communication between bacteria, skin cells and immune cells
- When disturbed, skin is susceptible to immune hypersensitivity disorders, such as eczema and skin allergies, or interfere with healing in people with chronic wounds



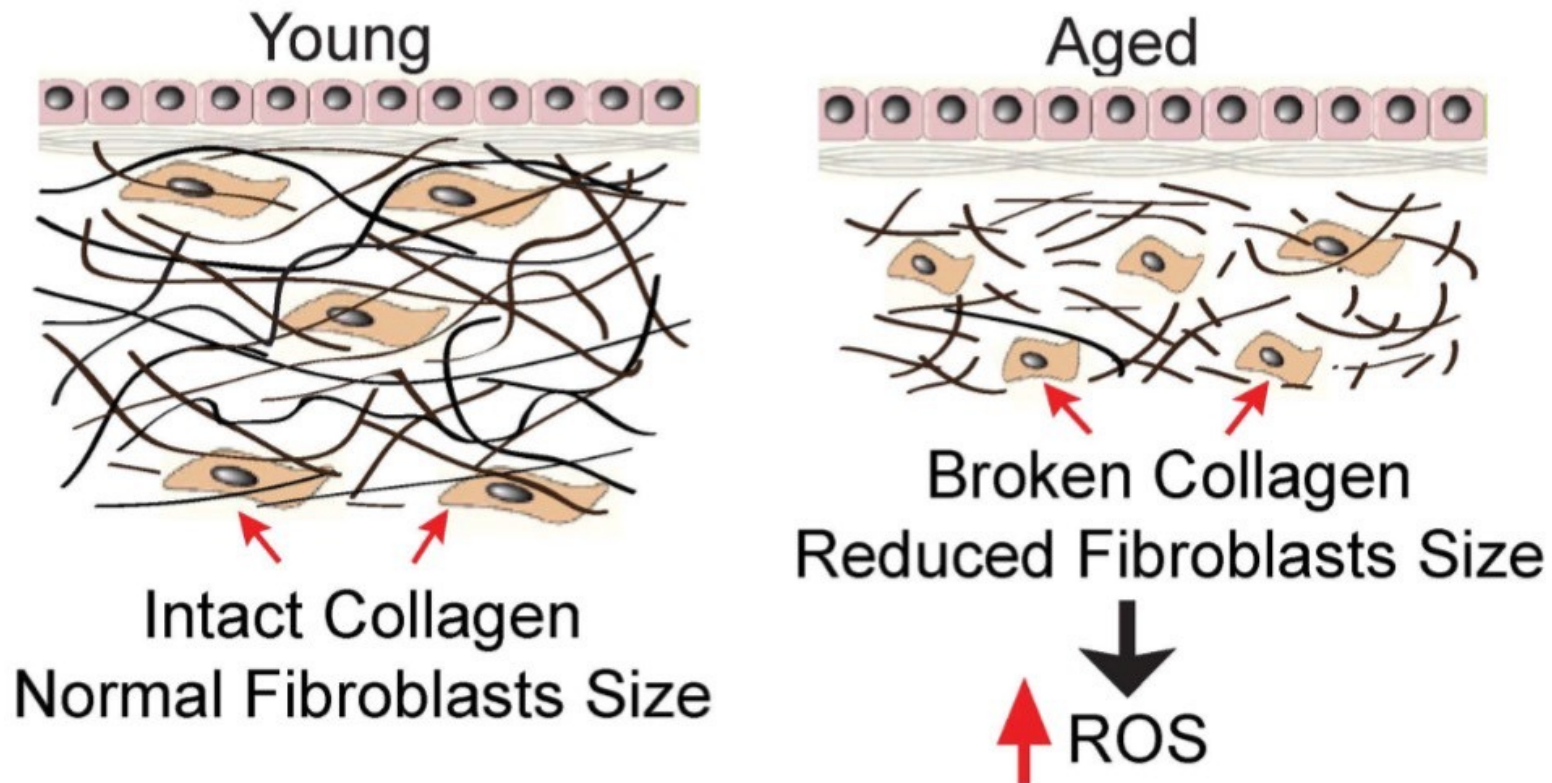
Causes of Skin Aging

- **Intrinsic** = Time + Genetics
- **Extrinsic** = Everything else
 - Pollution
 - Smoking
 - Climate/hydration
 - UV exposure/radiation
 - Sleep
 - Exercise
 - Stress- catecholamines and cortisol
 - Skin Care – topical, routines
 - **Nutrition/ supplements**

4 main causes of aging



Aging of Skin Tissue



ROS= Reactive Oxygen Species

ROS is dangerous oxygen molecules generated by UV rays and pollution.

ROS attack and react with stable skin cell molecules, causing cross-linking of collagen and elastin while lessening skin's ability to repair itself.

Truth or Marketing Hype?

VITAMINS COLLAGEN
 Supplement for Men & Women

96 mg of Collagen for Healthy Skin, Hair, Bones, Muscles & Tendons | 180 Gummies, 90-Day Supply

COLLAGEN
 Fruit Supplement
 ADULT GUMMY VITAMINS
 CITRUS BASE TROPICAL FLAVORED GUMMIES

FEEL RADIANT AND HEALTHY

- Reduced volume of eye wrinkles
- Skin smoothness and elasticity
- Increased nail growth
- Available in capsule or powder forms

COLLAGEN REPLENISH
 WITH HYALURONIC ACID & VITAMIN C
 TO REPLENISH NATURAL COLLAGEN PRODUCTION
SKIN-REVITALIZING FRUIT CHEWS
 Helps reduce the appearance of wrinkles*
 Clinically studied soluble Bioactive Collagen Peptides*
 Helps maintain skin's elasticity*
 MIXED FRUIT FLAVOR
 NATURALLY FLAVORED FRUIT CHEW

SOLD OVER TEN MILLION UNITS

NEW COLLAGEN

moistfull Collagen

Super Collagen Water's Hydrating And Moisturizing Effect — **UPGRADED!**

COLLAGEN BEAUTY GLOW

VITAL PROTEINS COLLAGEN BEAUTY GLOW

Collagen per Serving
 Skin, Hair, Nail & Joint Support
 Vitamins A, B6, C, E & Hyaluronic Acid
 Strawberry Lemon
 Dietary Supplement

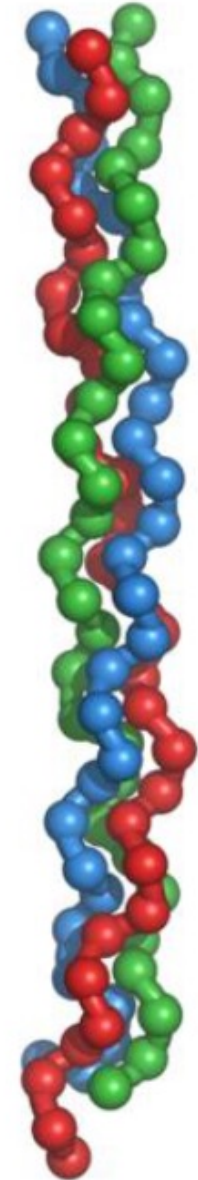
Natural Whole Nutrition

COLLAGEN PEPTIDES

10g Collagen per Serving
 Skin, Hair, Nail & Joint Support*
 Grass Fed - Pasture Raised
Unflavored
 Dietary Supplement

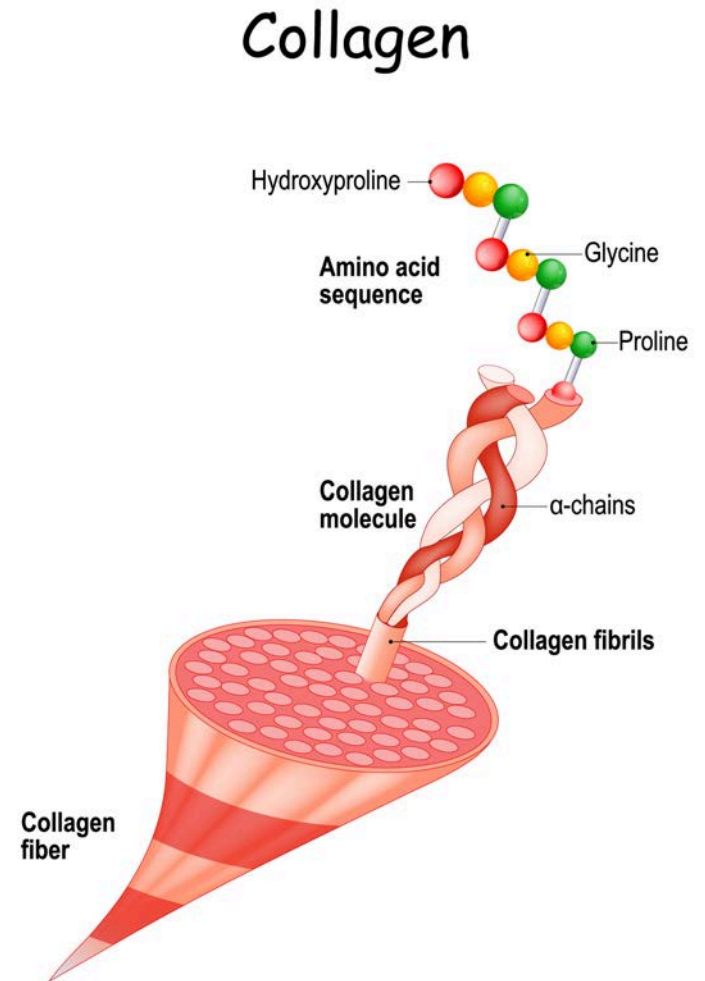
Collagen

- From the Greek word kólla, meaning "glue" and -gen, meaning "producing"
- Main structural protein in the extracellular matrix (ECM) in the various connective tissues in the body
- The most abundant protein in mammals
- Makes up approximately 25% to 35% of the whole-body protein content
- The fibroblast is the most common cell that creates collagen

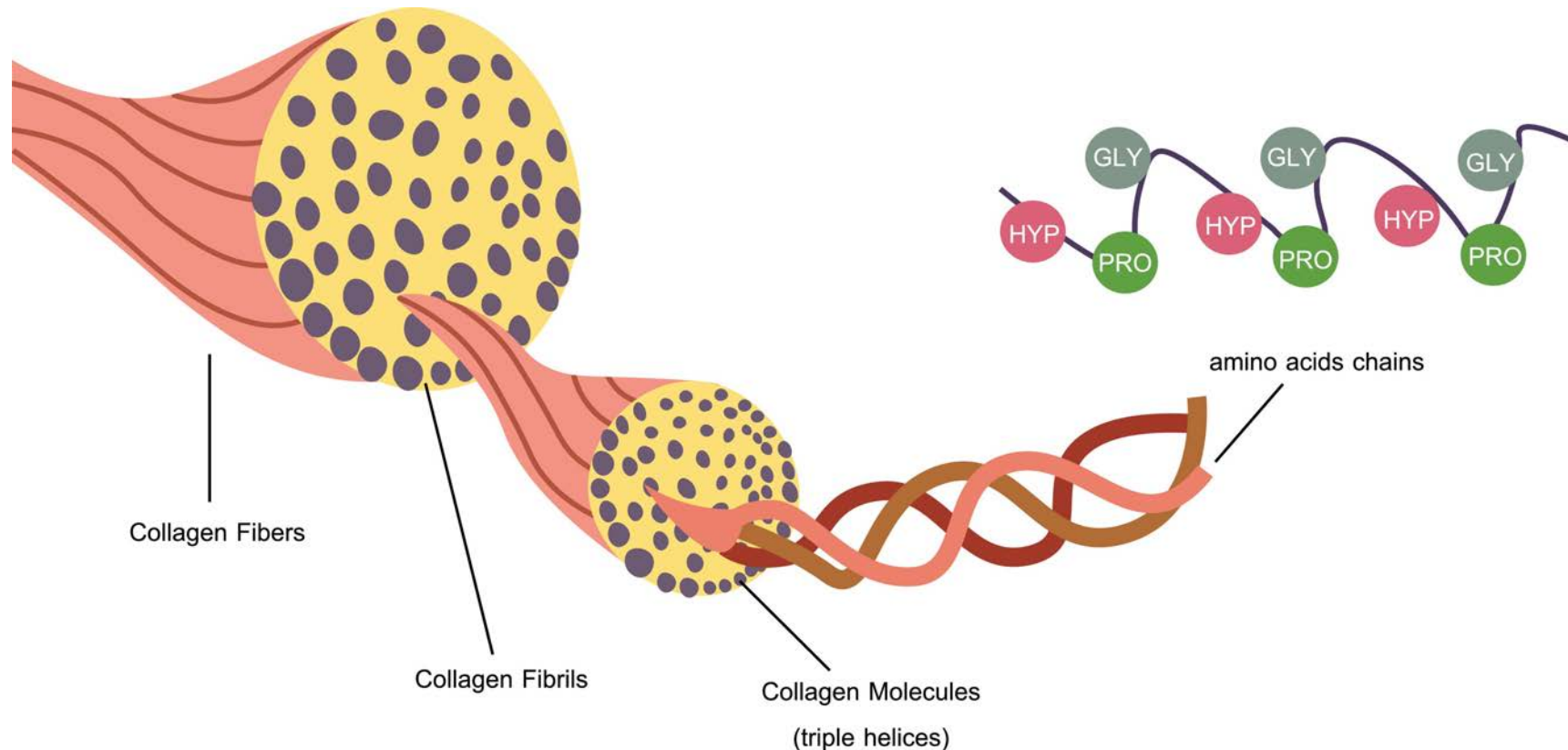


Collagen Chemistry

- Composed of a triple helix
 - Two identical chains and an additional chain that differs slightly in its chemical composition
- The amino acid composition of collagen is atypical for proteins
 - Every third amino acid is a glycine molecule, according to the formula GLY-X-Y
 - Proline and hydroxyproline makes up about 23% of amino acid content of collagen
 - Proline → Hydroxyproline → Collagen
 - Co-factor for this hydroxylation is vitamin C



Organization of Collagen



Individual α -chains are woven into triple helices via a zipper mechanism.

Bundles of triple helices form fibrils and these fibrils are aggregated into larger fibers.

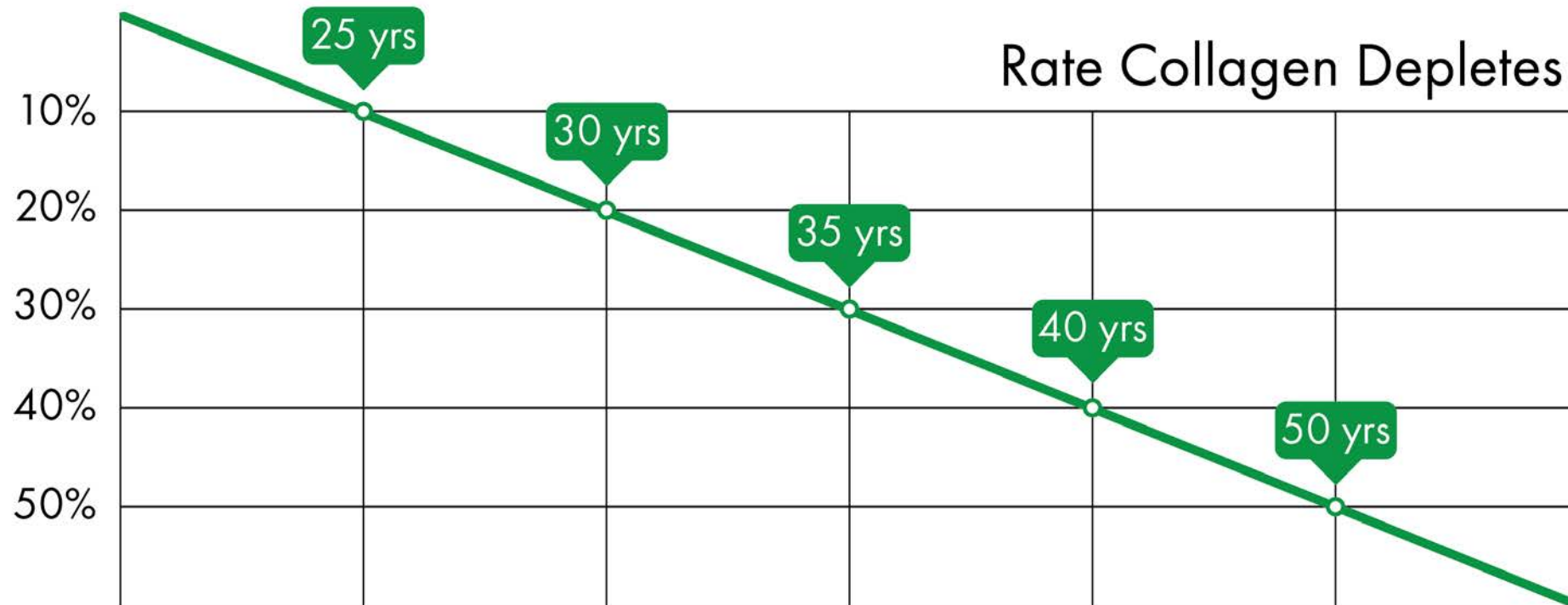
Types of Collagen¹

Type	Function
Type I	<ul style="list-style-type: none">• Skin, tendon, vasculature, organs, bone (main component of the organic part of bone)• 70% of the collagen in the human skin is Type I²
Type II	Cartilage
Type III	Reticulate (main component of reticular fibers)
Type IV	Forms basal lamina, the epithelium-secreted layer of the basement membrane
Type V	Cell surfaces, hair, and placenta

1. Ricard-Blum, S. (2011). The Collagen Family. Cold Spring Harbor Perspectives in Biology. 3 (1): a004978. doi:10.1101/cshperspect.a004978. PMC 3003457. PMID 21421911.

2. Rangaraj A, Harding K, Leaper D. Role of collagen in wound management. Wounds. 7(2) June 2011.

Collagen and Aging



The Big Question



Can consuming collagen supplements improve skin from wrinkles to wounds?

Protein Requirements

- RDA = 0.8 g/kg
- Based on needs for healthy people
- May be too low for older adults

Aside from aging, the top reason people don't have enough collagen is poor diet

Your body can't make collagen if it doesn't have the necessary elements

Recommended Protein Intake for Pressure Injuries

- **1.25 to 1.5** grams protein/kg body weight

....for an adult at risk of a pressure injury or with an existing pressure injury who is assessed to be at risk of malnutrition when compatible with goals of care, and reassess as condition changes...



Recommended Dietary Sources of Collagen

- **Bone broth**

- Draws collagen out of beef, chicken or fish bones

- **Protein rich foods**

- Beef
- Chicken
- Fish
- Beans
- Eggs
- Dairy products (milk, cheese)

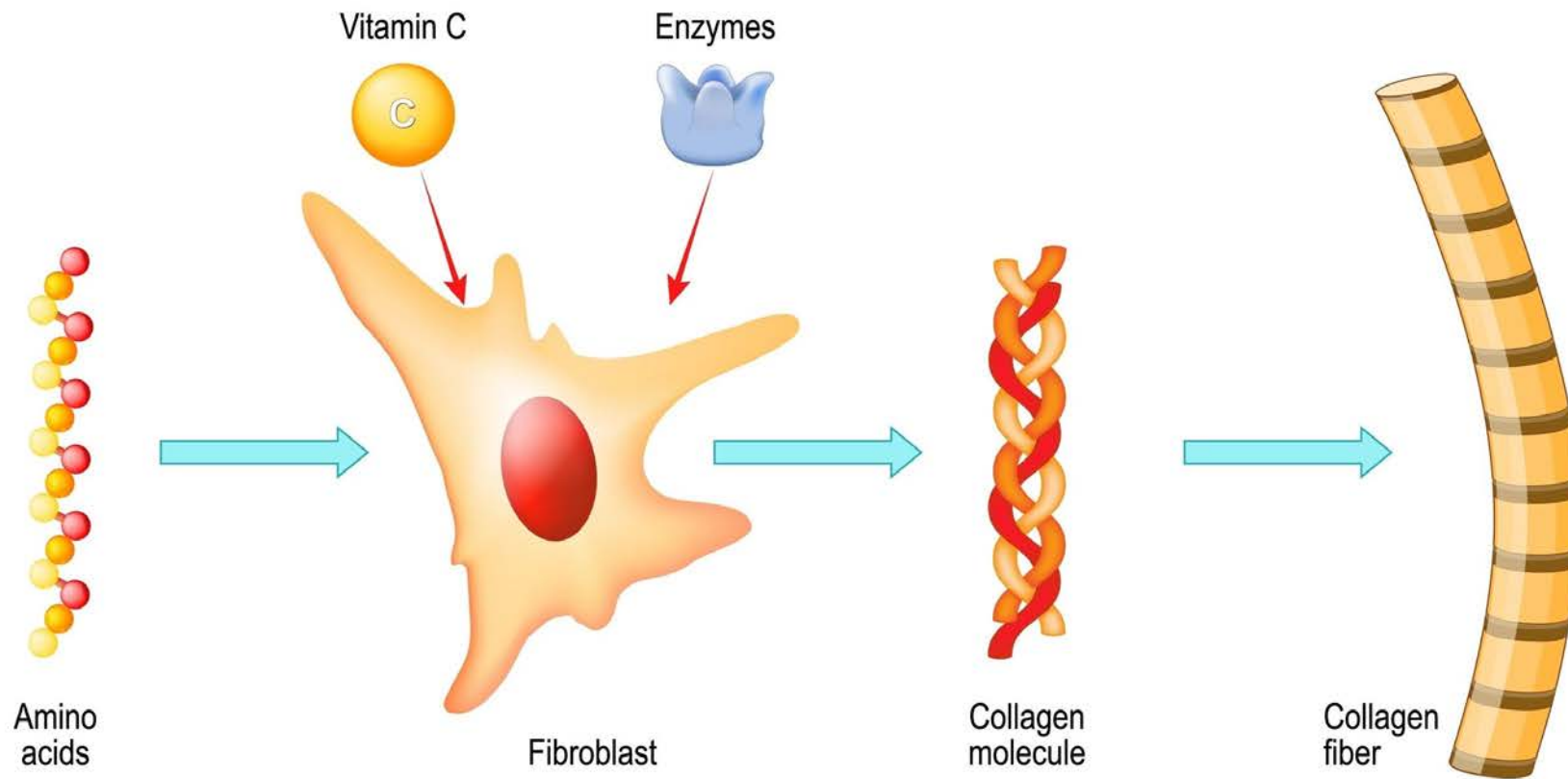
- **Vitamin C rich foods**

- Citrus fruits (oranges, grapefruits)
- Red and green peppers
- Tomatoes
- Dark green, leafy vegetables (broccoli, kale, Brussels sprouts)

- **Zinc and copper-rich foods**

- Meats
- Shellfish
- Nuts
- Whole grains
- Beans

Collagen Synthesis



Evaluating Collagen Supplements

- **Type** – bovine, porcine, marine
- **Source** – pesticides, contaminants, husbandry concerns
- **Form** – powder, liquid
- **Cost**
- **Taste and palatability**
- **Amino acid profile**
- **Bioavailability**



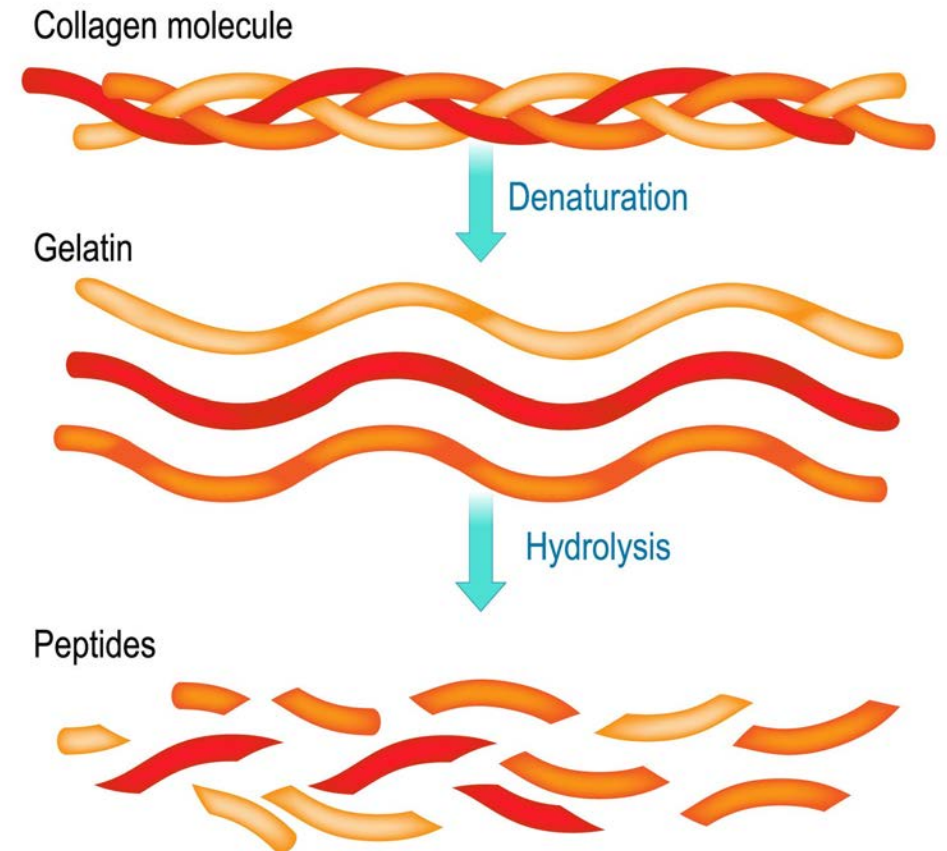
The image shows a hand holding a magnifying glass over a nutrition label. The label is titled 'Nutrition Typical values (cooked as per instructions)' and lists various nutrients with their values per 100g, per 1/4 pack, and as a percentage of the adult guideline daily amount (GDA). The label also includes a separate GDA for children (5-10 yrs) and a note that GDAs are guidelines and personal requirements vary.

	per 100g	per 1/4 pack	% adult GDA	GDA children (5-10 yrs)
Energy kJ	1007	2014		
Energy kcal	241	482		
Protein	8.4g	16.8g	24.1%	1800
Carbohydrate	20.6g	41.2g	37.3%	24g
of which sugars	1.8g	3.6g	17.9%	220g
of which starch	18.8g	37.6g	4.0%	85g
Fat	13.7g	27.4g	39.1%	70g
of which saturates	5.7g	11.4g	57.0%	20g
mono-unsaturates	5.9g	11.8g		
polyunsaturates	1.5g	3.0g		
Fibre	0.9g	1.8g		
Salt	0.50g	1.00g		
of which sodium	0.20g	0.40g		

GDAs = Adult Guideline Daily Amounts are based on a 70kg male, 60kg female. GDAs are guidelines and personal requirements vary depending on age, gender, weight and activity level.

Hydrolyzed Collagen

- Denatured collagen forms gelatin
- Enzymatic hydrolysis results in collagen hydrolysates (CH)
- CH: collagen broken down into small protein chains
 - collagen peptides
- CH is soluble in water at ambient temperature due to low molecular weight
 - This allows product development



Effects of hydrolyzed collagen supplementation on skin aging: a systematic review and meta-analysis



- Medline, Embase, Cochrane, LILACS (Latin American and Caribbean Health Sciences Literature), and Journal of Negative Results in BioMedicine databases
- Randomized, double-blind, and controlled trials that evaluated oral supplementation with hydrolyzed collagen as an intervention and reported at least one of the following outcomes: **skin wrinkles, hydration, elasticity, and firmness**
- 19 studies were selected
 - 1,125 participants
 - Aged between 20 and 70 years
 - 95% women

The Meta Results

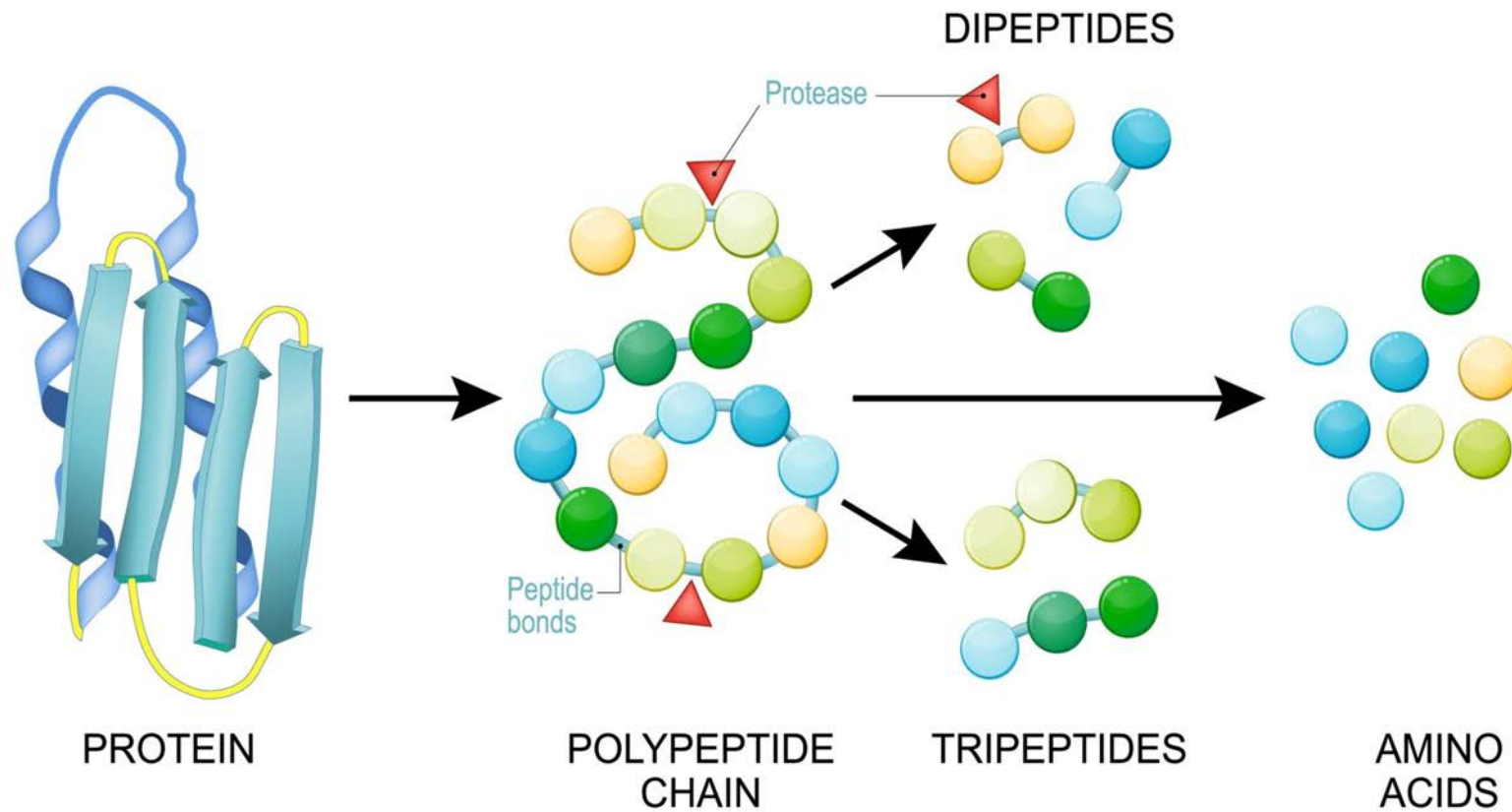
- Favorable results of CH supplementation compared with placebo for
 - ✓ skin hydration
 - ✓ elasticity
 - ✓ wrinkles
- Based on results, ingestion of hydrolyzed collagen for 90 days is effective in reducing skin aging





What if your skin concerns go well beyond wrinkles?

Digestion of Proteins



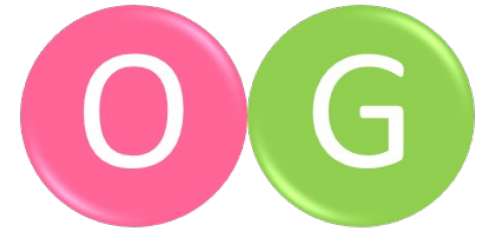
Collagen Di-Peptides Specific to Wound Healing

- Readily absorbed through the wall of small intestine
- PO is a low molecular weight fibroblast-initiating factor
- Enhances wound healing by stimulating the growth of p75NTR-positive fibroblasts
- Promotes hyaluronic acid synthesis, required for maintaining dermal integrity

Pro-Hyp
prolyl-hydroxyproline



Hyp-Gly
Hydroxyprolyl-Glycine

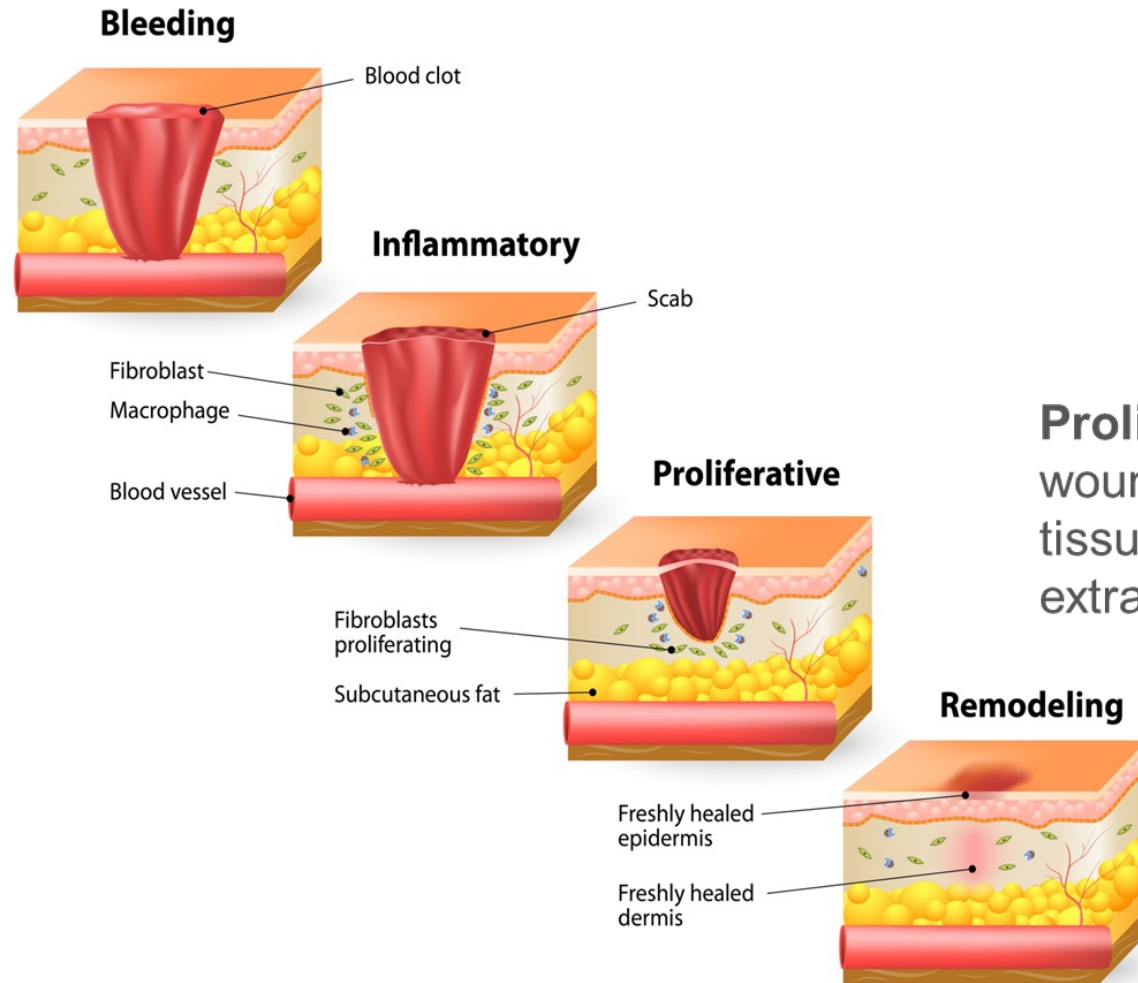


Not easily degraded

- PO is twisted
- OG is stacked

WOUND HEALING

- ✓ Granulation tissue fills in the wound bed
- ✓ Fibroblasts lay collagen in the wound bed, strengthening new granulation tissue
- ✓ Epithelial cells migrate from the wound margins



Proliferative phase: when the wound is rebuilt with new tissue made up of collagen and extracellular matrix

SCIENTIFIC REPORTS

OPEN

Ingestion of bioactive collagen hydrolysates enhanced pressure ulcer healing in a randomized double-blind placebo-controlled clinical study

Received: 2 February 2018

Accepted: 18 July 2018

Published online: 30 July 2018

Fumihito Sugihara¹, Naoki Inoue¹ & Sriraam Venkateswarathirukumara²

We conducted a double blind, multi-centric, placebo-controlled, randomized trial to compare the Pressure Ulcer Scale for Healing (PUSH) and Pressure Sore Status Tool (PSST) scores and wound area measurements at 16 weeks of subjects with pressure ulcers who were given standard care plus one of two types of collagen hydrolysate (CH-a), which contained low levels of prolylhydroxyproline (Pro-Hyp) and hydroxyprolyl glycine (Hyp-Gly), and CH-b, which contained high levels of Pro-Hyp and Hyp-Gly with the placebo group. A total of 120 subjects with stage II or III pressure ulcers were entered into the trial and 112 subjects completed the study. The subjects were randomized to receive CH-a (n = 39), CH-b (n = 39), or a placebo (n = 42) twice daily (10 g per day) for 16 weeks. The PUSH score, PSST score, and wound area of the CH-b group were significantly lower than the placebo group at week 16 (PUSH score, $P < 0.001$; PSST score, $P < 0.01$; wound area, $P < 0.05$). The PUSH score of the CH-a group was significantly lower than the placebo group at week 16 ($P < 0.05$). This study demonstrated that CH-b ingestion helps healing of pressure ulcers as an add-on to the standard therapy.

Collagen Dipeptides in Pressure Injury Healing

DESIGN

- 16 week double blind study
- Multi-center
- n = 120 enrolled
- n = 112 completed

INTERVENTION

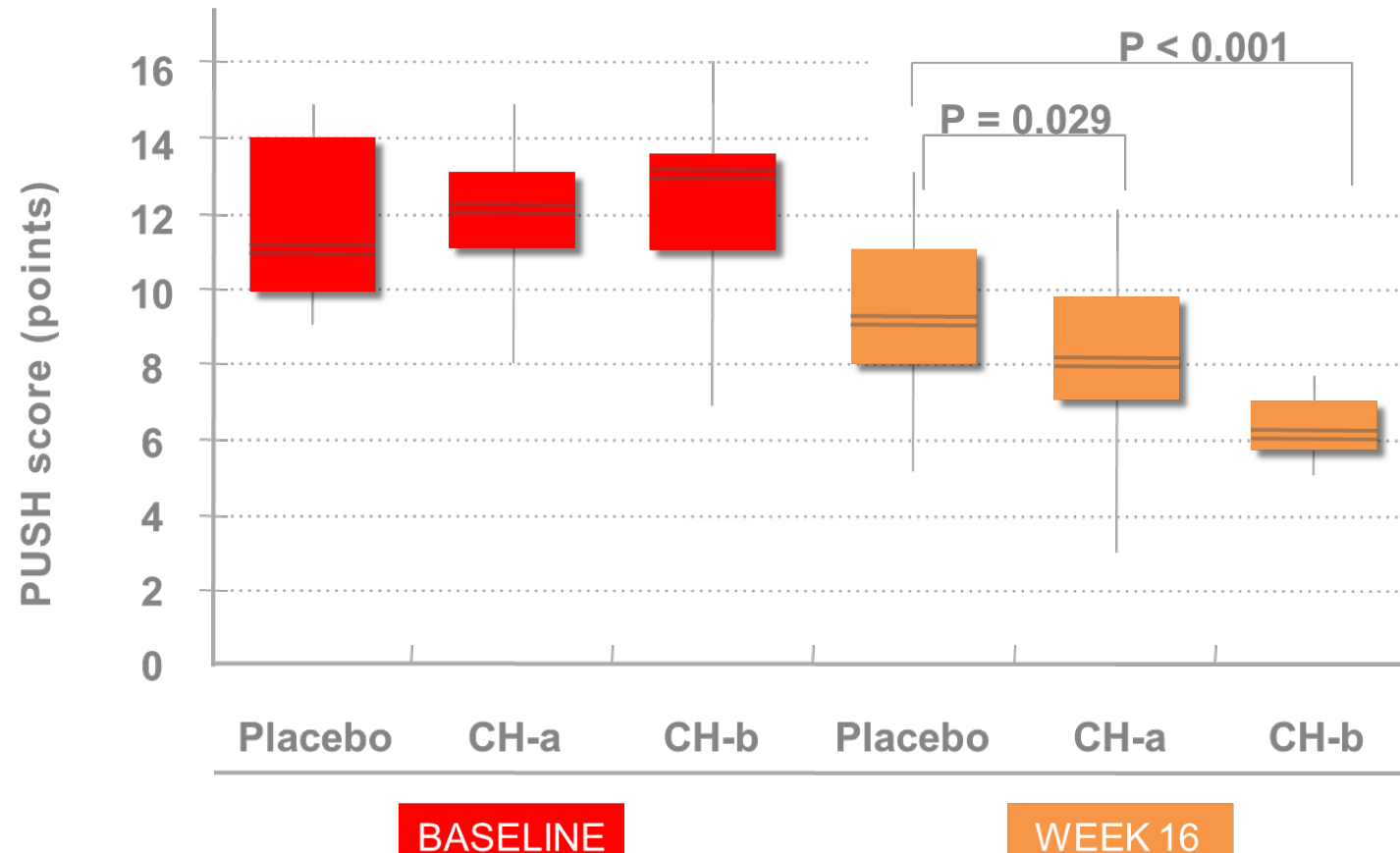
- Three randomized study groups
 1. CH-a (n = 39) Low level of PO and OG
 2. CH-b (n = 39) High level of PO and OG
 3. Placebo (n = 42)
- Twice daily (10g per day) for 16 weeks

OUTCOME

- Measure
 1. PUSH score
 2. PSST score
 3. Wound area

Results:

Pressure Ulcer Scale for Healing (PUSH) Score



CH-a = Ordinary collagen hydrolysate

CH-b = collagen hydrolysate with high concentration of PO and OG

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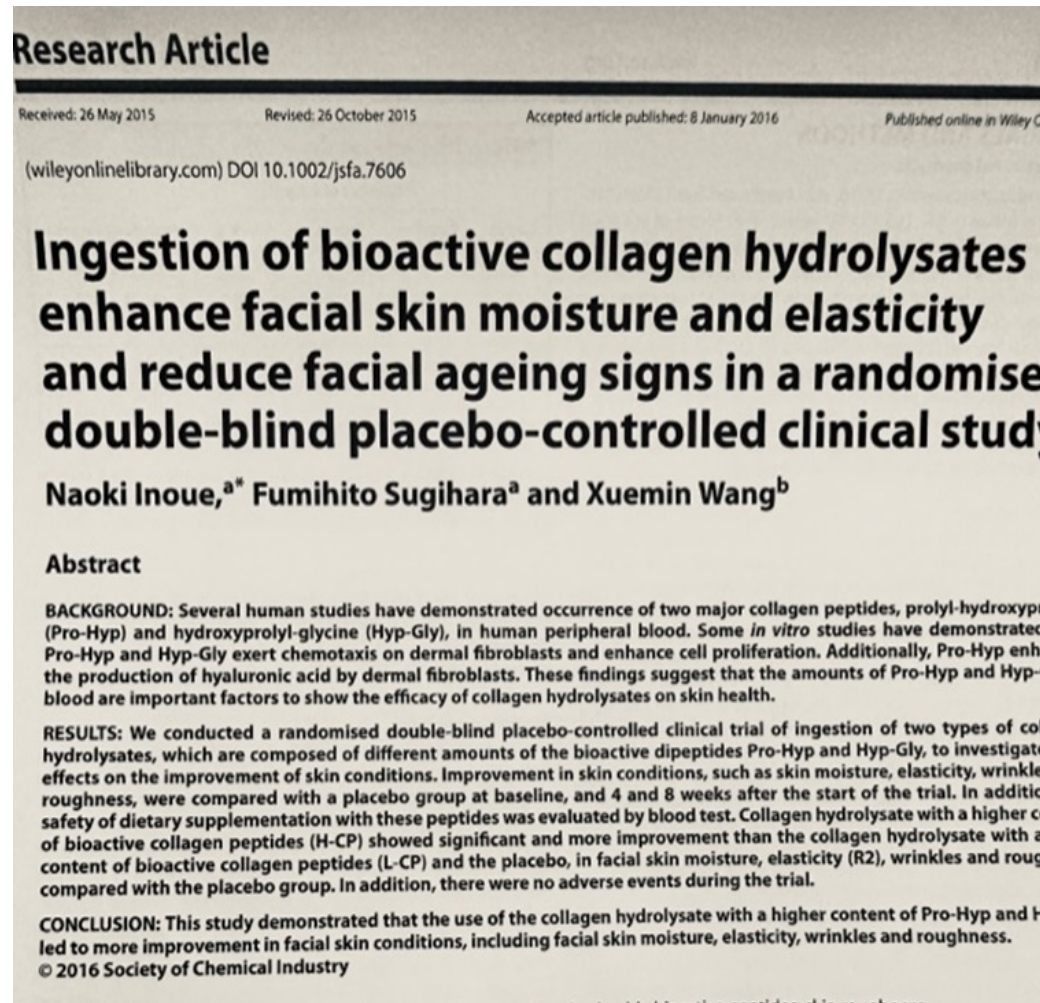
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“These results suggest that although all CH are derived from similar raw materials, it might be possible to control the healing effects of CH on pressure ulcers by altering their dipeptide content...”

PO and OG on Skin Health



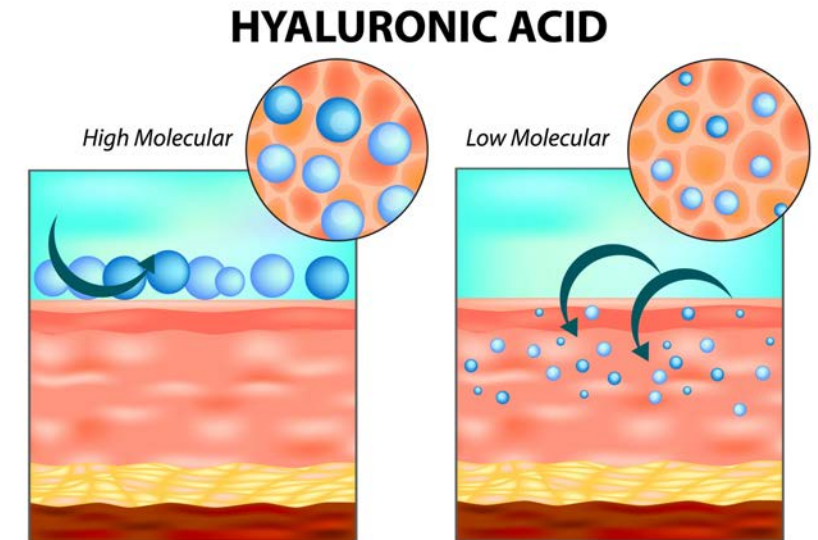
- Double blind placebo-controlled study
- Three groups (placebo, low content of bioactive collagen peptide, high content of bioactive collagen peptides)
- Assessed at baseline, week 4, and week 8
- n=85 females aged 35 – 55 yo

Results

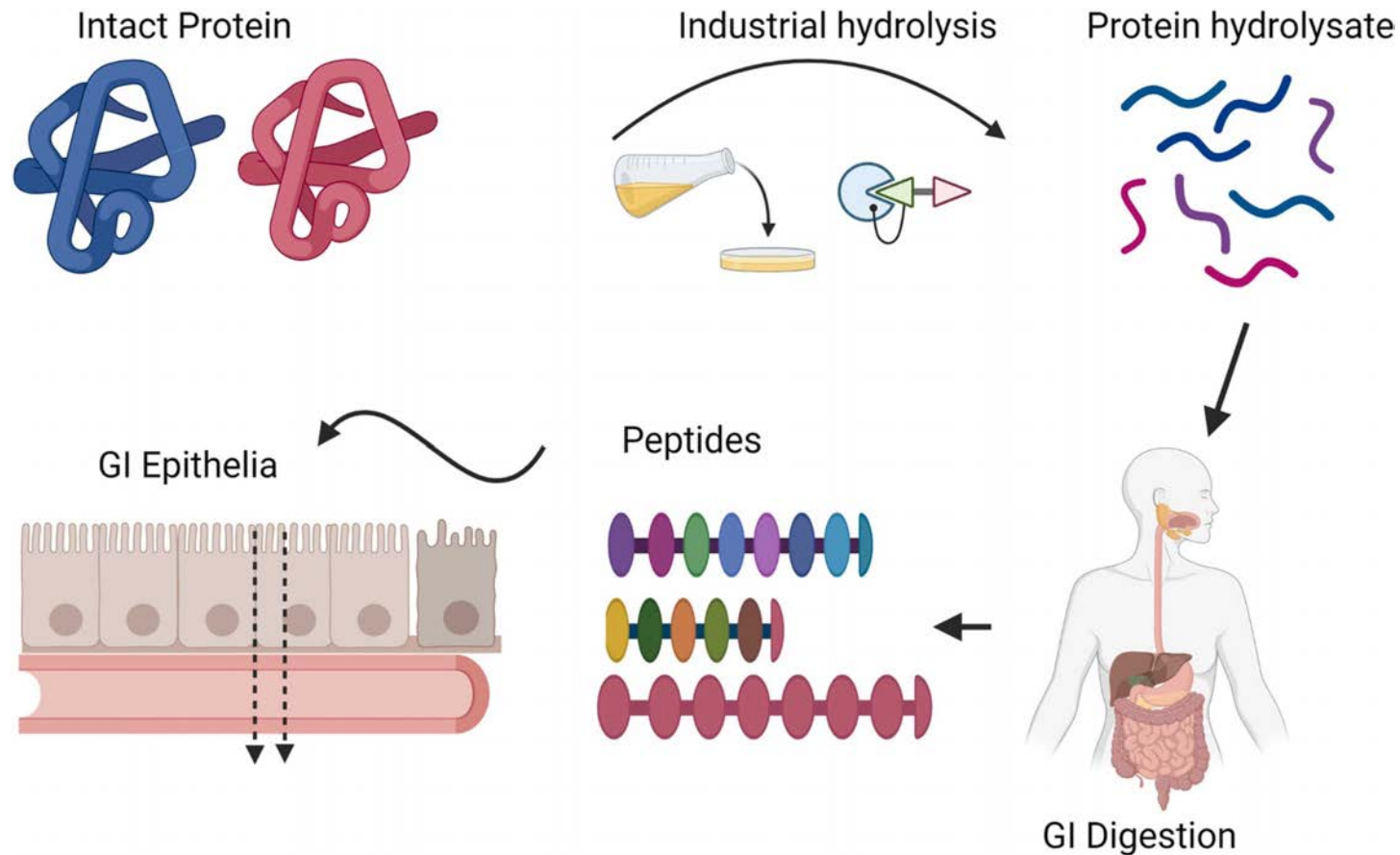
Higher concentration of PO and OG improved moisture, elasticity, wrinkles, and roughness

PO and OG Enhance Cell Proliferation

- Exerts chemotaxis on dermal fibroblasts
- Enhances the production of hyaluronic acid
 - From the Greek word *hyalos*, meaning glass
 - Associated With smoothness of the skin
- May improve barrier function to improve moisture
- May stimulate the synthesis of Type I collagen
- May be able to enhance uptake by increasing the concentration of bioavailable peptides in products



The Future Will Bring Even More Applications



The market for collagen hydrolysates is expected to reach over \$1 billion by 2026!

Separating the Science from the Trends

- Low molecular weight collagen peptides support skin health from wrinkles to wounds
 - ✓ Decreases breakdown of collagen
 - ✓ Increases production of collagen
 - ✓ Reduces ROS in ECM
 - ✓ Reduces inflammation
- Use your clinical judgment in finding reputable products



Time for Questions, Thoughts, Comments



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