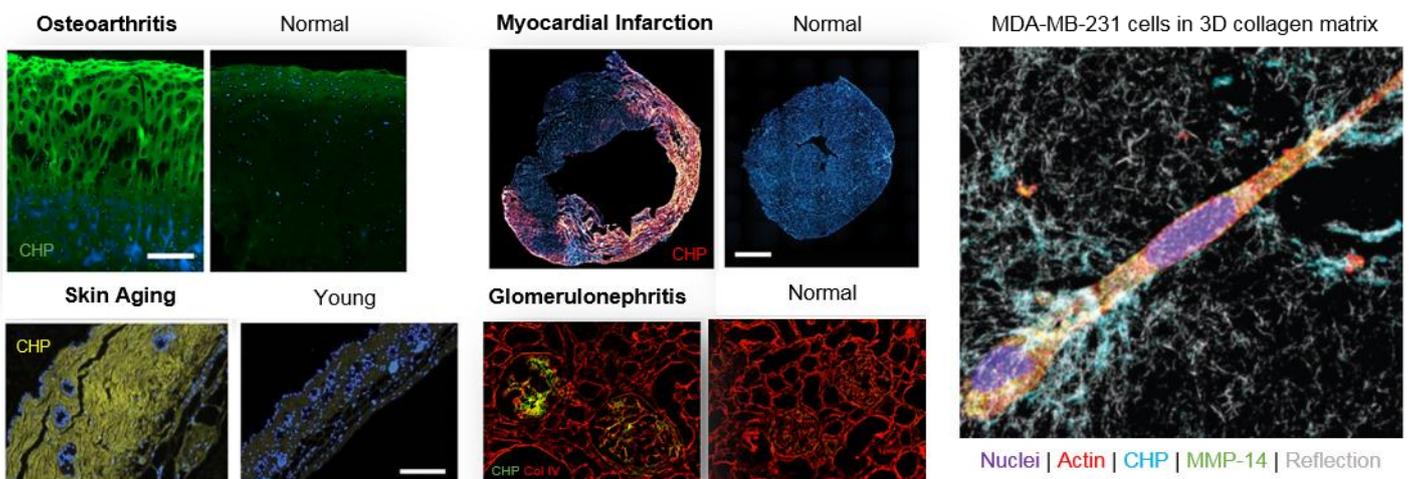


## Targeting degraded collagen with **Collagen Hybridizing Peptides (CHP)**



### Special features

- A non-antibody approach without species restrictions
- Relies on collagen's secondary triple helix structure instead of a defined sequence
- High affinity with essentially no nonspecific binding
- Applicable to nearly every tissue type
- Suitable for both frozen and paraffin-embedded sections
- Stable at 4 °C, no need to aliquot for storage

### Applications

- **Histopathology:** CHP marks tissue damage and remodeling during pathological and physiological events<sup>[1,2]</sup>
- **Collagen identification:** CHP visualizes collagen bands of all types in SDS-PAGE with high specificity<sup>[3]</sup>
- **Mechanical damage:** CHP enables measuring and localizing of mechanical injury to collagenous tissue at molecular level in various tissues (e.g. bone, cartilage, tendon, ligament, blood vessel, skin etc.)<sup>[4]</sup>
- **Tissue decellularization:** CHP allows direct and quantitative assessment of denatured collagen in ECM materials<sup>[5]</sup>

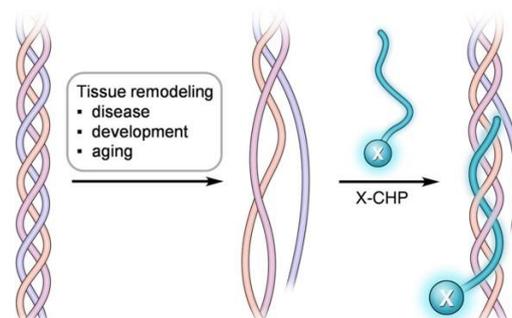
## Targeting degraded collagen with Collagen Hybridizing Peptide (CHP)

Collagen is the most abundant protein in mammals. It is the major structural component of almost all organs and tissues. Excessive collagen degradation is implicated in a variety of pathological conditions, such as cancer, arthritis and fibrosis<sup>[6]</sup>.

The triple helix is the hallmark structure of collagen. During tissue remodeling, the triple helical collagen molecules are degraded by specific proteases (e.g. MMP or cathepsin K) and become unfolded at body temperature. The **Collagen Hybridizing Peptide (CHP)** is a synthetic peptide that can specifically bind to such denatured collagen strands through hydrogen bonding in histology<sup>[1]</sup>, *in vivo*<sup>[2]</sup>, and *in vitro* (3D cell culture)<sup>[7]</sup>. CHP is an extremely specific probe for unfolded collagen: it has negligible affinity to intact collagen molecules due to the lack of binding sites; it is also inert towards non-specific binding because of its neutral and hydrophilic nature<sup>[3]</sup>.

### Principle of the Collagen Hybridizing Peptide (CHP)

By sharing the structural and sequence motif of natural collagen, CHP has a strong capability to hybridize with denatured collagen strands, in a fashion that is similar to a DNA fragment annealing to its complementary DNA strand during PCR.



- CHP is a powerful **histopathology** tool which enables straightforward detection of tissue damage caused by a large variety of diseases, as well as tissue remodeling during development and aging<sup>[2]</sup>.
- In **cell imaging**, CHP robustly visualizes the pericellular collagen turnover caused by proteolytic migration of cancer cells within 3D collagen matrix, without the use of synthetic fluorogenic matrices or genetically modified cells<sup>[7]</sup>.

### References

1. *In situ imaging of tissue remodeling with collagen hybridizing peptides.* ACS Nano, 2017.
2. *Targeting collagen strands by photo-triggered triple-helix hybridization.* Proc. Natl. Acad. Sci. U.S.A., 2012.
3. *Direct detection of collagenous proteins by fluorescently labeled collagen mimetic peptides.* Bioconj. Chem., 2013.
4. *Molecular level detection and localization of mechanical damage in collagen enabled by collagen hybridizing peptides.* Nat. Commun., 2017.
5. *Molecular assessment of collagen denaturation in decellularized tissues using a collagen hybridizing peptide.* Acta Biomater., 2017.
6. *Targeting and mimicking collagens via triple helical peptide assemblies.* Curr. Opin. Chem. Biol., 2013.
7. *Visualizing collagen proteolysis by peptide hybridization: From 3D cell culture to in vivo imaging.* Biomaterials, 2018.

### Available products

Item	Description	Regulatory status	Package size	Product Code
Collagen Hybridizing Peptide, 5 FAM Conjugate (F-CHP) <sup>1</sup>	CHP coupled with 5 FAM for immunofluorescence	RUO	60 µg	FLU60
			300 µg	FLU300
Collagen Hybridizing Peptide, Cy3 Conjugate (R-CHP) <sup>1</sup>	CHP coupled with Cy3 for immunofluorescence	RUO	60 µg	RED60
			300 µg	RED300
Collagen Hybridizing Peptide, Biotin Conjugate (B-CHP) <sup>1</sup>	CHP coupled with biotin for immunohistochemistry and SDS-PAGE	RUO	60 µg	BIO60
			300 µg	BIO300

<sup>1</sup> Distributed for 3Helix Inc., Salt Lake City, USA