Supplementary results

Characterization of the individual peptides

The peptides were characterized by MALDI-TOF/TOF. From Figure S1, we noticed that PepA, PepB, and PepE underwent amino acid substitutions while PepC and PepF lost some of its amino acids.

Figure S1. MALDI-TOF/TOF of the different peptides. From top to bottom and left to right: PepA, PepB, PepC, PepD, PepE, PepF, PepG, KP.
Affinity characterization of hair protein model (KeraPep) with each individual peptide by MALDI-TOF/TOF

The affinity of the peptides to hair proteins was tested through their reaction with KeraPep, at two temperatures: 37°C (for all peptides) and 120°C (for PepA, PepE, PepG, and KP), Figure S2. All peptides were shown to interact with KeraPep at both temperatures, showing a higher interaction at 120°C.

Figure S2. MALDI-TOF/TOF of the products of the reaction of the KeraPep with the different peptides in study with the reaction at 37°C (A) and (B) 120°C. (C) Relative ratio of the reaction of the peptides and the KeraPep at 37°C and at 120°C.
Peptides’ penetration into straight Caucasian over-bleached hair fibres

For a more comprehensive study, the peptides were analysed in straight Caucasian over-bleached hair fibres. Fluorescence microscopy of transversal cuts of over-bleached hair confirmed the presence of all peptides in the hair fibre, Figure S3. The peptide uptake by Caucasian over-bleached hair (Figure S4) showed a good penetration profile being the KP, PepC, and PepF the peptides that showed higher uptake by the over-bleached hair fibre.

Figure S3. Fluorescence microscopy of cross sections of straight over-bleached hair fibres treated with 0.01% (w/v) of the peptides indicated.

Figure S4. Peptide uptake by straight over-bleached hair. The hair samples analysed are treated with 0.01% (w/v) of the peptides indicated. Data represents the mean ± standard deviation of independent experiments.
Hair treatment analysis: straightening African curly hair fibres

The peptides were applied to single curly hair with forced straightening to fix their conformation and straight the hair. With a concentration of 0.1% (w/v) of each peptide, they showed a high straightening efficiency, which can be observed in Figure S5.

Figure S5. Straighten curly hair by treatment with the peptides. The hair tresses represent (from left to the right): hair tress before the treatments, hair tress treatment without peptides, hair tress treated with 0.1% (w/v): PepA; PepB; PepC; PepD; PepE; PepF; PepG; KP; hair tress treated with typical chemical relaxing.