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20918 | *In vitro* evaluation of peptides with potential antioxidant, anti-inflammatory and antihypertensive activities

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Abstract

Hypertension develops from genetic and environmental factors, and is exacerbated by disorders that increase systemic vascular resistance, like oxidative stress, inflammation and immune system dysfunction[1,2]. The search for natural compounds as an alternative or a complement to the drugs used to treat hypertension and other chronic diseases has gained momentum in recent years[1]. One example is that of food-derived peptides as nutraceuticals[3,4,5]. In this context, we are exploring the antioxidant, anti-inflammatory, and antihypertensive potential of synthetic peptides derived from proteins found in milk (lactoferrins from different species of mammals) and in other food sources (e.g., jumbo squid - *Dosidicus gigas*).
Antioxidant activity *in vitro* was determined by both the DPPH radical scavenging activity and the Ferric Reducing Antioxidant Power (FRAP) assays. While none of the squid peptides was active, lactoferrin (LF) ones showed antioxidant potential: aLF-17-31, from donkey (*Equus africanus asinus*) LF, displayed the stronger radical scavenging activity (IC_{50} 3.53 mol/mol DPPH), and nhLF-268-284, from human (Homo sapiens) LF, showed the stronger reducing power (1.26 ± 0.86 mM Fe2+ equivalents). The ABTS radical scavenging activity of LF peptides was further assessed, with bLF-1-11 from bovine (Bos taurus) LF standing out with a Total Antioxidant Status (TAS) of 5.68 ± 9.23 mM. The peptides' ability to inhibit the angiotensin converting enzyme 1 (ACE1) was also tested *in vitro*, as an indication of their antihypertensive potential; squid peptide RC7 inhibited ACE1 with an IC_{50} of 908.6 µM. Relevantly, none of the peptides was cytotoxic (MTT assay on macrophages), as only bLF1-11 showed some toxicity (IC_{50} 417.6 µg/mL).
In conclusion, new non-toxic food-derived peptides with antioxidant/antihypertensive activity were found. Ongoing studies will assess their anti-inflammatory activity (Griess method) as well as their effect of on the TAS in macrophages (superoxide anion production).

Keywords: Hypertension, nutraceuticals, bioactive peptides, antioxidant, anti-inflammatory, antihypertensive.

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