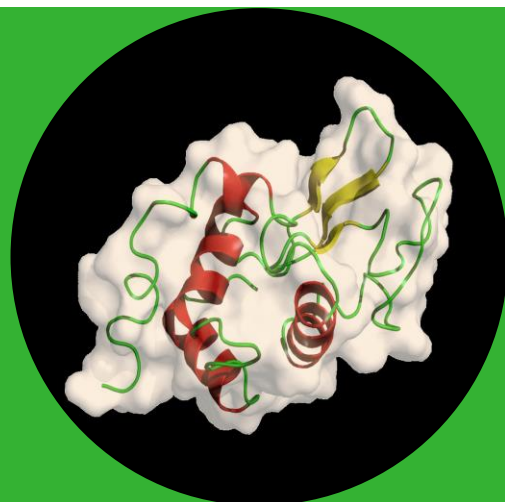


Bioactive Food & Feed Ingredients

In vivo active natural compounds



FOOD & BIOBASED RESEARCH
WAGENINGEN UR



Bioactive Food & Feed Ingredients (BFFI) is one of the expertise groups of the contract research institute Food & Biobased Research, part of Wageningen University and Research centre. BFFI focuses on the development of *in vivo* active ingredients that are healthy, contribute to the prevention of diseases or are mildly therapeutic.

Track record BFFI

BFFI has over 20 years of experience in the development of bioactive peptides and other natural components for application in functional foods / nutraceuticals with respect to e.g. cardiovascular diseases and diabetes. Furthermore, the group is well experienced in High-Throughput Screening of antimicrobial components with a range of micro-organisms such as bacteria, fungi and yeast.

BFFI has been participating in several (inter)national (EU-)projects, often in close collaboration with small and medium-sized enterprises and has performed a great number of bilateral, confidential projects with companies.

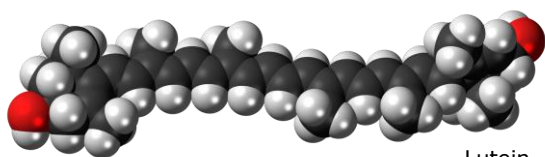


What BFFI can offer

BFFI is offering the following skills and expertise:

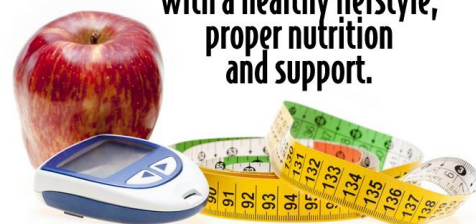
- Consultancy on finding new leads with respect to *in vivo* active compounds
- Development of bioactive food and feed ingredients
- Setting up new *in vitro* bioassays for high-throughput screening
- Formulation of bioactive ingredients in food/feed matrices
- Introduction to several (academic) hospitals for performing animal studies and human trials

For more information, feel free to contact us.



Lutein

**YOU can control diabetes
with a healthy lifestyle,
proper nutrition
and support.**



Information

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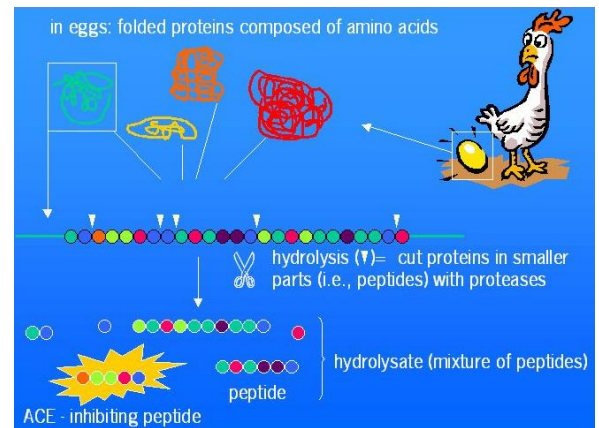
www.wageningenUR.nl/en/fbr

BFFI expertise

- *In vitro* hydrolysis of high-potential proteins --> Over 20 different proteases and protease mixtures have been used in optimizing the bioactivity of proteins.
- Development/Application of miniaturized *in vitro* bioassays for selected enzymes (drug targets):
 - Angiotensin Converting Enzyme (ACE); cardiovascular system
 - Lipoprotein-associated PhosphoLipase A2 (Lp-PLA2; = platelet-activating factor acetylhydrolase; PAF-AH); coronary heart disease and stroke
 - DiPeptidyl-Peptidase-4 (DPP4); glucose metabolism
 - α -glucosidase; glucose absorption in intestine
 - CycloOxygenase (COX; = prostaglandin-endoperoxide synthase; PTGS); prevention of inflammation and pain
 - Xanthine Oxidase; generates reactive oxygen species (ROS)
- Antioxidant assays such as the DPPH and ORAC tests; prevention of 'low grade inflammation'.
- *In vitro* cell assays: Several cell lines are available (intestinal epithelial and entero-endocrine cells) to study uptake of food ingredients and their resulting intracellular processes. *In vitro* transwell Caco-2 cell cultures can for example be used to study parameters related to the 'leaky gut syndrome'.

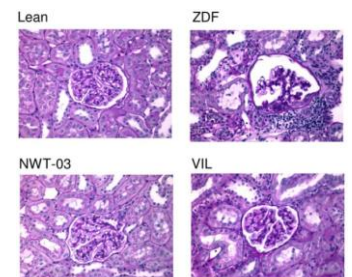
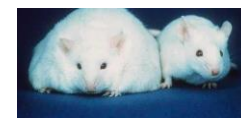
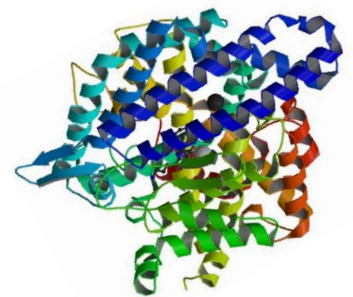
Example projects

- NWT03 (Newtriflow) was developed in close collaboration with Newtricious, Oirlo, The Netherlands. NewtriFlow is IP-protected (WO2006009448 "Anti-hypertensive functional food products", priority date 22-7-2004) and is based on an enzymatically hydrolyzed protein from egg white. It has very promising effects on the maintenance of cardiovascular health and glucose metabolism. (<http://www.newtricious.nl/en/products/newtriflow%C2%AE>)
- Furthermore, animal studies in a type 2 diabetes model (ZDF rats) showed that long-term supplementation with NWT-03 attenuated renovascular damage. A comparison to the DPP4-inhibitor Vildagliptin suggested that the effects of NWT-03 were related to both ACE- and DPP4-inhibitory properties (published in PLoS ONE 7(10), 2012: e46781, doi:10.1371/journal.pone.0046781).
- Antimicrobial peptides (EU projects FAIR CT96-1181 & FAIR CT97-3135): Search for alternatives to chemical antibiotics inspired by increasing antibiotic resistance.
- Screening for bioactive peptides in fish proteins (ACE- and DPP4-inhibiting and antioxidant activity).
- MacuView: MacuView is specialized nutrition for the prevention and inhibition of the progression of Age-related Macular Degeneration. At the request of Newtricious the initial fluidic product was transformed into a powder formulation by the FFC business unit of FBR. BFFI contributed to this project by assessing the *in vitro* bioavailability of lutein from the new formulation using intestinal epithelial Caco-2 cells. (<http://www.macuview.nl>)
- Ongoing project: Development of a mouth spray with a functional food ingredient for patients who suffer from dry mouth syndrome.

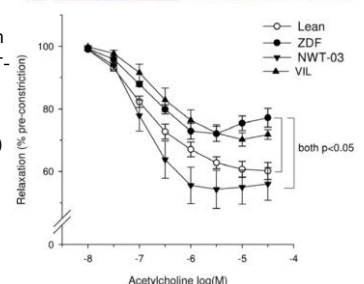


Schematic representation of the development of ACE-inhibiting peptides from chicken egg proteins by food-grade hydrolysis.

Human Angiotensin I Converting enzyme (ACE-I); involved in the regulation of blood pressure.



Effect of NWT-03 and the DPP4-inhibitor Vildagliptin (VIL) on reno-vascular damage in Zucker diabetic fatty (ZDF) rats, a type-2 diabetes model. Long-term supplementation with NWT-03 exerted a beneficial effect by attenuating glomerulosclerosis (above) and preventing aortic endothelial dysfunction (below). Results: Buikema et al., 2012



MacuView: specialized nutrition to prevent macula degeneration

