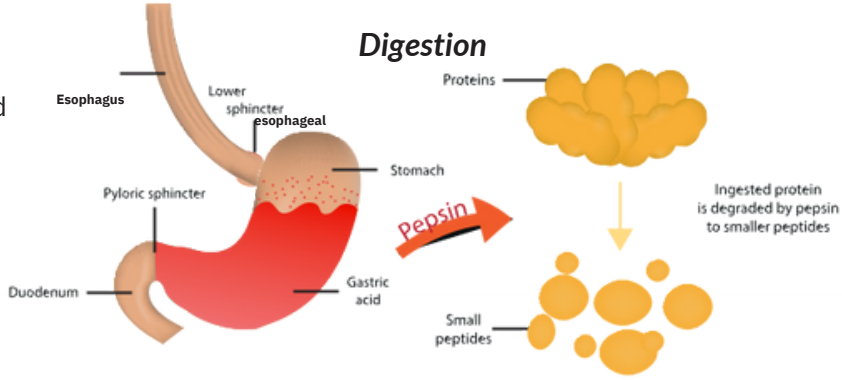
Peptide vs Whole Protein: Food Sensitivity Testing

VibrantWellness

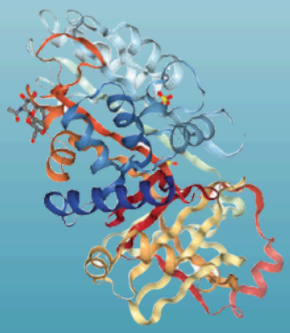
Whole proteins



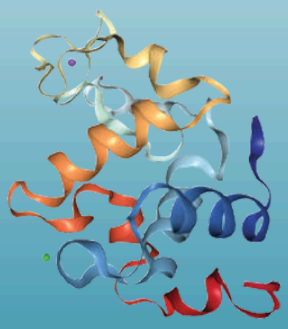
- ***Proteins*** are one or more chains of amino acids bound together by peptide bonds.
- Proteins from foods enter the gastrointestinal tract and begin to undergo digestion in the hydrochloric acid of the stomach, where bonds are broken to yield larger polypeptides.
- When food sensitivity testing is performed, the blood of the patient is tested for antibody reactions to whole protein or extracts (which contain proteins, but also remnants of carbohydrates and fats from the food) of the foods being tested, which reflect if the patient has formed antibodies to the whole protein (undigested) forms of the foods. Antibody-to-antigen binding happens only in protein-based molecules, and does not occur with carbohydrates or lipids.
- Whole protein sensitivity testing is also limited to testing the water-soluble portions of proteins, which leaves out peptides or protein fragments that are not water-soluble (such as gluten).

Peptides

- In the small intestine, larger polypeptides are broken into smaller peptides and smaller peptides are further digested into individual amino acids.
- It is at this point that they can also be incorrectly identified by aberrant immune responses as ‘foreign’ proteins that the immune system will react to either locally in the intestinal mucosa, or systemically extra-intestinally (joint pain, migraines, skin rashes, etc).
- When immune tolerance is optimal, smaller peptides and amino acids can then be absorbed through the intestinal epithelial lining into circulation and reassembled in the body for use. But, this may NOT be what occurs when the intestinal barrier is permeable, or ‘leaky.’
- Testing at the peptide level is the only way to detect antibodies against all regions of a protein. This also provides high fidelity synthesis of long mer peptides – the purest form of antigen presentation which cannot be achieved at the extract or protein level.



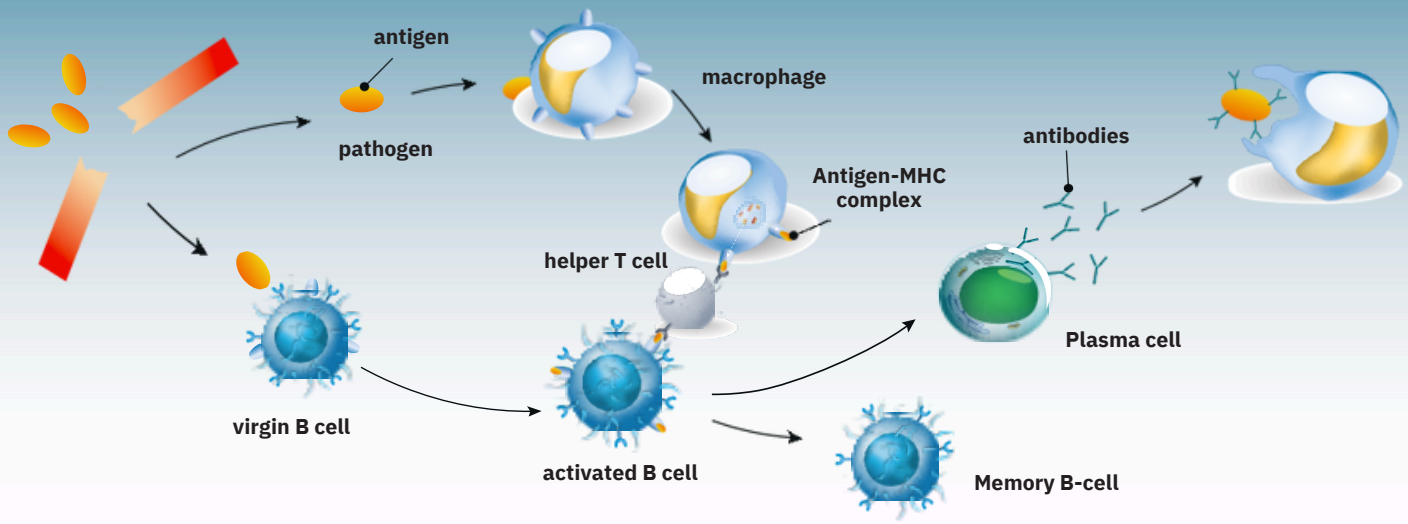
Structure of ovalbumin 1UHG.
From AS Rose, AR Bradley, Y Valasatava, JM Duarte, A Prlić and PW Rose. Web-based molecular graphics for large complexes. ACM Proceedings of the 21st International Conference on Web3D Technology (Web3D '16): 185-186, 2016. doi:10.1145/2945292.2945324



Structure of hen’s egg lysozyme 5WRB peptide.
From AS Rose, AR Bradley, Y Valasatava, JM Duarte, A Prlić and PW Rose. Web-based molecular graphics for large complexes. ACM Proceedings of the 21st International Conference on Web3D Technology (Web3D '16): 185-186, 2016. doi:10.1145/2945292.2945324

Even though both lysozyme and ovalbumin are peptides found in the larger shape of egg white protein, they have vastly different conformations, and, therefore, would not be bound by the same antibodies. Antibodies to egg white protein would also be significantly different shapes than antibodies that are able to bind to either ovalbumin or lysozyme peptides.

Immune Response Basics



Clinical Application

- Antibodies to a whole protein will not recognize or bind peptides, even if those peptides are found in that whole protein.
- This is why antibodies to beta-casein do require one to eliminate all cow's milk foods, even if one is not sensitive to whole cow's milk protein. Cow's milk protein will eventually be enzymatically broken down into peptides, one of which is beta-casein. Clinically, testing for food sensitivities at the peptide level eliminates uncertainty around variables that affect digestion.
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Other Benefits of Peptide-Level Food Sensitivity Testing

Increased Sensitivity and Reduced Cross-Reactivity	Testing for food sensitivities at the peptide level increases the sensitivity of the test because peptides in foods are highly specific to the food from which they are derived, and cannot induce cross-reactivity or be 'confused' by the immune system for another food protein
Raw vs Cooked	Because sensitivities at the peptide level are detected once whole proteins are broken down into peptides, whether or not the food is cooked does not affect the accuracy of the results.
Digestive Insufficiency	Under normal circumstances there should be no whole proteins present in the small intestine, and definitely not even able to fit through tight junctions in a 'leaky gut.' Multiple antibodies to reactive foods are possibly more an indication of insufficient digestive function (hypochlorhydria, achlorhydria, or insufficient digestive enzymes).

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