Consistent with guidance published by European Food Safety Authority (Naegeli et al., 20171), CropLife International members have created the linked document which describes the process used to identify and add new peptides, should they exist, to a list of peptides implicated in celiac disease published by Sollid et al., 20202 and expanded in 2021 by CropLife International members. Potential peptides were identified through a comprehensive targeted literature search and publication review to determine if the publications contained novel peptides of interest, and if so, whether those peptides conformed to criteria described in Sollid et al., 20123 or were contained in crystal structure data. Through publication review, it was concluded that a total of 10 peptides, five amidated and five deamidated, met the criteria for the inclusion in the 2024 database.

The identification of new peptide sequences was performed on November 11, 2023 by conducting three publication searches.

* A search of the Core Collection of Web of Science and Medline using the term:

**TS=((celiac\* or coeliac\* or ((gluten or glutenin or gliadin) near/3 (intoleran\* or sensiti\* ))) AND (wheat or barley or spelt or rye or oat or gliadin or gluten\*) and (peptid\* or epitop\* or motif) AND (t-cell-epitop\* OR t-cellreceptor OR t-cell-response or tcell or TCR or MHC or HLA-DQ2 OR HLADQ8) AND (activat\* or recogn\* or stimulat\* or response\*))**

* And searches to identify publications that cited either Sollid et al., 20203 or Sollid et al., 20122. These searches used the Core Collection of Web of Science and Scopus.

All three searches were confined to a timeframe between November 4, 2023 through November 10, 2023.

Publications identified by the three searches were collated, de-duplicated and then compared to the publications that were previously reviewed in the 2023 database build process. A total of 32 publications were identified (see list below).

The 32 publications were divided into groups of eight and each group was assigned to two reviewers such that each of the 32 publications received two independent reviews.

The reviewers were tasked with identifying whether the publication contained one of two classes of information that identified novel peptides that were not found in the 2023 CropLife Celiac Peptide Database.

* Did the publication feature structural data of a complex composed of an HLA-DQ molecule, a peptide and a T-Cell receptor?
* Did the publication fulfill the criteria described in Sollid et al., 20122.
  + Reactivity against the epitope must have been defined by at least one specific T-cell clone.
  + The HLA-restriction element involved must have been unequivocally defined.
  + The nine-amino acid core of the epitope must have been defined either by an analysis with truncated peptides and/or HLA-binding with lysine scan of the epitope or comparable approach.

Of the 32 publications reviewed, only Chlubnova, M., et al. 20234, contained novel peptide sequences that either fulfilled the requirements of Sollid et al., 20122 or contained HLA-DQ molecule-peptide-T-Cell receptor structural data.

A complete selection of 2024 celiac peptides, including transamidations can be found [here](https://croplife.org/wp-content/uploads/2024/02/3_2024_celiac_peptide_table.docx):

A complete selection of 2023 celiac peptides, including transamidations can be found [here](https://croplife.org/wp-content/uploads/2023/02/3_2023_Celiac_Peptide_Table.pdf):

A complete selection of 2022 celiac peptides, including transamidations can be found [here](https://croplife.org/wp-content/uploads/2022/03/2022-Celiac-Peptide-Table.docx):

A complete selection of 2021 celiac peptides, including transamidations can be found [here](https://croplife.org/wp-content/uploads/2021/02/2021_Celiac_Peptide_Table.docx):

A complete selection of 2020 celiac peptides, including transamidations can be found [here](https://croplife.org/wp-content/uploads/2021/02/2020_Celiac_Peptide_Table.docx):

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https://efsa.onlinelibrary.wiley.com/doi/full/10.2903/j.efsa.2017.4862

Sollid, L. M., Tye-Din, J. A., Qiao, S.-W., Anderson, R. P., Gianfrani, C., and Konig, F. (2020). Update 2020: nomenclature and listing of celiac disease relevant gluten epitopes recognized by CD4+ T cells. Immunogenetics 72, 85–88.

1. Sollid L, Qiao SW, Anderson R, Gianfrani C, Koning F (2012) Nomenclature and listing of celiac disease relevant gluten T-cell epitopes restricted by HLA-DQ molecules. Immunogenetics 64: 455–460.
2. Chlubnová M, Christophersen AO, Sandve GKF, Lundin KEA, Jahnsen J, Dahal-Koirala S, Sollid LM. Identification of gluten T cell epitopes driving celiac disease. Sci Adv. 2023 Jan 25;9(4):eade5800. doi: 10.1126/sciadv.ade5800. Epub 2023 Jan 25. PMID: 36696493; PMCID: PMC9876541.

**The 32 publications identified in the search are as follows:**

1. Abbasi, A., et al. (2023). A Critical Review on the Gluten-Induced Enteropathy/Celiac Disease: Gluten-Targeted Dietary and Non-Dietary Therapeutic Approaches. Food Reviews International.
2. Afzal, M., et al. (2023). Reference proteomes of five wheat species as starting point for future design of cultivars with lower allergenic potential. npj Science of Food 7(1).
3. Auricchio, R., et al. (2023). Antibody Profile, Gene Expression and Serum Cytokines in At-Risk Infants before the Onset of Celiac Disease. International Journal of Molecular Sciences 24(7).
4. Banerjee, P., et al. (2023). Specific Genetic Polymorphisms Contributing in Differential Binding of Gliadin Peptides to HLA-DQ and TCR to Elicit Immunogenicity in Celiac Disease. Biochemical Genetics.
5. Bevilacqua, A., et al. (2023). Gluten Friendly: Technology and effects of flour and bread on gut microbiota of celiac subjects. A review. Food Bioscience 53.
6. Bradauskiene, V., et al. (2023). Wheat consumption and prevalence of celiac disease: Correlation from a multilevel analysis. Critical Reviews in Food Science and Nutrition 63(1): 18-32.
7. Brouns, F., et al. (2023). Diet associations in endometriosis: a critical narrative assessment with special reference to gluten. Frontiers in Nutrition 10.
8. Chlubnova, M., et al. (2023). Identification of gluten T cell epitopes driving celiac disease. Science Advances 9(4).
9. da Silva, S., et al. (2023). Evidence of increased gluten-induced perturbations in the nucleophilic tone and detoxifying defences of intestinal epithelial cells impaired by gastric disfunction. Food Research International 173.
10. D'Amico, V., et al. (2023). Does sourdough bread provide clinically relevant health benefits? Frontiers in Nutrition 10.
11. Funsten, M. C., et al. (2023). Microbiota-dependent proteolysis of gluten subverts diet-mediated protection against type 1 diabetes. Cell Host and Microbe 31(2): 213-227.e219.
12. Iversen, R. and L. M. Sollid (2023). The Immunobiology and Pathogenesis of Celiac Disease. Annual Review of Pathology-Mechanisms of Disease 18: 47-70.
13. Kumar, S., et al. (2023). Gluten-Related Disorders: Current Understanding, Myths, and Facts. Wheat Science: Nutritional and Anti-Nutritional Properties, Processing, Storage, Bioactivity, and Product Development: 321-338.
14. Lin, D., et al. (2023). Improved functionality and safety of peptides by the formation of peptide-polyphenol complexes. Trends in Food Science and Technology 141.
15. Liu, D., et al. (2023). An elite \u03b3-gliadin allele improves end-use quality in wheat. New Phytologist 239(1): 87-101.
16. Loppinet, E., et al. (2023). LRP-1 links post-translational modifications to efficient presentation of celiac disease-specific T cell antigens. Cell Chemical Biology 30(1): 55-+.
17. Machado, M. V. (2023). New Developments in Celiac Disease Treatment. International Journal of Molecular Sciences 24(2).
18. Mamone, G., et al. (2023). Analytical and functional approaches to assess the immunogenicity of gluten proteins. Frontiers in Nutrition 9.
19. Marín-Sanz, M., et al. (2023). Unraveling the celiac disease-related immunogenic complexes in a set of wheat and tritordeum genotypes: implications for low-gluten precision breeding in cereal crops. Frontiers in Plant Science 14.
20. Moustakas, A. K., et al. (2023). Autoimmune susceptible HLA class II motifs facilitate the presentation of modified neoepitopes to potentially autoreactive T cells. Cellular Immunology 390.
21. Murray, J. A., et al. (2023). Safety and tolerability of KAN-101, a liver-targeted immune tolerance therapy, in patients with coeliac disease (ACeD): a phase 1 trial. Lancet Gastroenterology & Hepatology 8(8): 735-747.
22. Noma, S., et al. (2023). Characterization of \u03b1-gliadin alleles of Japanese wheat cultivars in relation to flour dough extensibility and celiac disease epitopes. Journal of Cereal Science 109.
23. Nye-Wood, M. G., et al. (2023). Low Gluten Beers Contain Variable Gluten and Immunogenic Epitope Content. Foods 12(17).
24. Romero, M. M., et al. (2023). In vivo sensitization to gliadin by oral administration. Methods in cell biology 179: 51-57.
25. Segura, V., et al. (2022). A Highly Sensitive Method for the Detection of Hydrolyzed Gluten in Beer Samples Using LFIA. Foods (Basel, Switzerland) 12(1).
26. Seitz, V., et al. (2023). Specific T-cell receptor beta-rearrangements of gluten-triggered CD8+ T-cells are enriched in celiac disease patients' duodenal mucosa. Clinical immunology (Orlando, Fla.) 256: 109795.
27. Skoracka, K., et al. (2023). Why are western diet and western lifestyle pro-inflammatory risk factors of celiac disease? Frontiers in Nutrition 9.
28. Tomer, R., et al. (2023). Prediction of celiac disease associated epitopes and motifs in a protein. Frontiers in Immunology 14: 1056101.
29. Tömösközi, S., et al. (2023). Screening and use of nutritional and health-related benefits of the minor crops. Developing Sustainable and Health-Promoting Cereals and Pseudocereals: Conventional and Molecular Breeding: 57-85.
30. Tye-Din, J. A., et al. (2023). Efficacy and safety of gluten peptide-based antigen-specific immunotherapy (Nexvax2) in adults with coeliac disease after bolus exposure to gluten (RESET CeD): an interim analysis of a terminated randomised, double-blind, placebo-controlled phase 2 study. Lancet Gastroenterology & Hepatology 8(6): 446-457.
31. Wang, Y., et al. (2023). Celiac Disease and the Risk of Cardiovascular Diseases. International Journal of Molecular Sciences 24(12).
32. Zhang, H., et al. (2023). Study on electrospinning of wheat gluten: A review. Food Research International 169.