Activation of Gut Peptides/Proteins _In Vitro_ Using P84

Objective: To evaluate and optimize the effects of P84 on gut peptide/ protein secretions in _in vitro_ cell models.

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Introduction

In the last 10–20 years, scientific research has fundamentally reshaped our understanding of human health. At the center of this transformation lies the gut. Once viewed only as a digestive tract, the gut is now recognized as a complex, vast network of organs, microbes, and signaling pathways that influence nearly every function in the human body and collectively shapes the foundation of whole-body health.

Known as the "second brain," the gut communicates directly with the brain, influencing emotions, stress levels, and cognitive function through an intricate network of nerves and chemical signals. When this system is in balance, we feel energized, focused, and resilient. But when it's out of balance, the effects ripple throughout the body and can manifest itself as bloating, cramps, gas, sensitivity to foods, low energy, brain fog, weight gain, etc.

Modern environmental and lifestyle factors, including diets rich in processed foods, widespread antibiotic usage, sedentary behavior, smoking, and chronic stress, can severely alter the function and composition of the gut and its microbiota. Consequently, regulating, repairing, and restoring gut function and microbial balance has become a focal point in today's world.

Proper regulation of the gastrointestinal tract allows for proper stress responses, and it is fundamental in maintaining the body's internal stability, resilience, immunity, and vitality. It ensures that nutrients are digested and broken down, efficiently absorbed, and delivered to the cells. When these digestive functions work properly, it creates a feedback loop that sustains overall health.

One of the most significant discoveries is the existence of the gut-brain axis, which is a bidirectional communication system linking the enteric nervous system, central nervous system, and intestinal microbiota. Through neural, endocrine, and immune pathways, the gut exerts measurable influence on mood, cognition, and stress response. The gut produces regulatory neuroactive proteins such as serotonin, dopamine, and gamma-aminobutyric acid (GABA), which further supports the notion that gastrointestinal health plays a direct role in psychological and neurological well-being.

Another important aspect of gut health is its ability to repair itself. Strong and healthy intestinal cells allow for healthy gut lining and gut barrier function. Many people focus on detoxification, dieting, or supplementing, but its health starts with a solid foundation. The gut must first be calmed, sealed, and supported before it can properly digest food, efficiently absorb nutrients, produce key neurotransmitters that talk to the brain, maintain a strong and balanced immune system, regulate normal hormones and metabolism, and rebuild itself. When repair mechanisms work properly it supports everything from cardiovascular health and metabolic function to mental clarity and emotional well-being.

The next step in gut health is the restoration process. Within our gut, there is a microbiome consisting of a community of trillions of bacteria, viruses, fungi, and other microorganisms. It is one of the most biologically diverse systems known and collectively contains over 100 times more genes than the human genome. These microbes contribute to the breakdown of indigestible dietary components, synthesis of essential vitamins (such as B-complex and vitamin K), and regulation of energy metabolism. Beyond these traditional roles, more research indicates that the microbiome functions as a metabolic and immunological organ, interacting continuously with host tissues through biochemical signaling pathways. Approximately 70% of the immune system is localized within the gut-associated lymphoid tissue (GALT), elevating the gastrointestinal tract's critical role in immune modulation. Beneficial bacteria contribute to immune education by training the host to distinguish between beneficial and non-beneficial immune modulators. Disruptions in microbial composition have been implicated in a range of conditions.

In an effort to support gut health in an all-encompassing holistic way, LifeVantage investigated a 2-product system called P84, for its capacity to influence 14 different peptides and proteins associated with gut process regulation, gut repair, and gut restoration mechanisms. * †††

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*   These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
††† Results based on a cell culture study on P84.

P84 *In Vitro* Study

METHODS

P84 consists of two different formulations: PhytoPower 1 and PhytoPower 2. The combination was investigated for its ability to support the production of gut health markers in a comprehensive, holistic way using various *in vitro* cell models. The following 14 peptides/proteins of interest are listed in **Table 1**.

Table 1. Table 1 shows 14 peptides/proteins involved in regulating, repairing, and restoring gut function and microbial balance. * †††

Peptides/Proteins	Function
Vasoactive Intestinal Peptide (VIP)	Promotes and stimulates intestinal secretions and smooth muscle relaxation, helping to calm overreactive areas of the gut
Gastrin-Releasing Peptide (GRP)	Stimulates gastrin release and gastric acid secretion, promoting digestion and sending alerts to stimulate digestion
Neurotensin (NTS)	Regulates gut motility, secretion, and epithelial health
Oxyntomodulin (OXM)	Regulates appetite, slows gastric emptying, and coordinates nutrient absorption
Somatostatin (SST)	Inhibits excessive hormone (e.g., CCK, gastrin, insulin) secretion, helping to regulate key regulatory peptides
Cholecystokinin (CCK)	Stimulates bile and pancreatic enzyme secretion, regulating satiety and making sure fats and proteins are properly processed
Trefoil Factor 3 (TFF3)	Promotes mucosal and gut lining repair and health
Zonulin (HP-2)	Gatekeeper of cell barriers, keeping the good in and the bad out. Elevated levels indicate a negative shift in balance and weaker barrier function
Claudin-1 (CLDN1)	Supports healthy gut permeability (paracellular permeability) and ensures gut barriers are watertight
E-Cadherin (CDH1)	Promotes cell adhesion and maintains epithelial barrier integrity
Occludin (OCLN)	Maintains a healthy gut barrier, strengthening and stabilizing tight junctions
Epiregulin (EREG)	Promotes epithelial cell proliferation and supports new tissue formation
Mucin 2 (MUC2)	Creates the mucous barrier that protects and keeps the gut environment stable
Glucagon-Like Peptide 2 (GLP-2)	Stimulates mucosal growth and reduces permeability to foster a balanced environment for microbes to grow and thrive

Four different cell lines (HT-29, QGP-1, NCI-H716, Caco-2) were used to investigate peptide/protein productions. Cell lines were chosen because they produced the peptides or proteins of interest. Commercial Enzyme Linked Immunosorbent Assay (ELISA) kits were prepared for each protein/peptide.

ELISA METHODOLOGY

ELISA is a biochemical technique used to detect and quantify peptides, proteins, antibodies, and hormones. It is widely applied in research because it combines the specificity of antibodies with the sensitivity of enzyme assays. The basic principle is that an antigen-antibody interaction is detected and amplified through an enzyme-mediated color change. After treating each cell line with a certain concentration of P84, the liquid portion is collected and used as sample for ELISA testing. A special plate is "programmed" to recognize your target molecule, such as those peptides/proteins listed in Table 1. When the collected liquid samples are added, the peptides/proteins lock onto the key. This triggers a visible color change, which is proof that your peptide/protein is present in the sample. The color intensity is directly proportional to the amount of peptide/protein present in the sample.

RESULTS AND DISCUSSION

ELISA results

We grouped the results of each peptide/protein based on its ability to regulate, repair or restore gut function and microbial balance. The results show the changes of the 14 peptides/proteins as compared to control. (**Table 2-4**) [*] [†††]

Table 2. Change in production of **regulating** peptides/proteins as compared to control when treating cells with P84.

Peptide/Protein	Results
Vasoactive Intestinal Peptide (VIP)	Increased 100%
Gastrin-Releasing Peptide (GRP)	Increased 1,087%
Neurotensin (NTS)	Increased 50%
Oxyntomodulin (OXM)	Increased 77%
Somatostatin (SST)	Increased 19%
Cholecystokinin (CCK)	Increased 69%

Table 3. Change in production of **repair** peptides/proteins as compared to control when treating cells with P84.

Peptide/Protein	Results
Trefoil Factor 3 (TFF3)	Increased 116%
Zonulin (HP-2)	Decreased 19%
Claudin-1 (CLDN1)	Increased 16%
E-Cadherin (CDH1)	Increased 55%
Occludin (OCLN)	Increased 41%
Epiregulin (EREG)	Increased 58%

Table 4. Change in production of **restoring** peptides/proteins as compared to control when treating cells with P84.

Peptide/Protein	Results
Mucin 2 (MUC2)	Increased 35%
Glucagon-Like Peptide 2 (GLP-2)	Increased 18%

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The results confirmed activation of various proteins and peptides involved in regulating, repairing, and restoring the health of the gastrointestinal tract. The changes of all the 14 peptides/proteins were influenced in the desired direction. Zonulin decreased, whereas the other 13 proteins/peptides increased in magnitude. * †††

CONCLUSION

The body as a whole works through interconnected systems. This means that each organ, hormone, and process influences each other. One of these key systems is the gastrointestinal (GI) tract. It is not just responsible for digestion, but also acts as a command center for metabolic, immune, and emotional balance. Supporting the entire GI tract in a holistic way means supporting organs of digestion (stomach, intestines, liver, pancreas) as well as the trillions of microbes that make up the gut microbiome.

We investigated how P84 activates regulating, repairing, and restoring peptides and proteins to guide these gastrointestinal processes. * †††

P84 showed activation of 14 different proteins and peptides that are important throughout the gastrointestinal tract. †††

VIP, GRP, NTS, OXM, SST, and CCK work together and act like a biological control system, coordinating when to start digestion, move food along, absorb nutrients, slow down digestion, and signal the brain that you are full. The production of these 6 peptides increased by 100%, 1087%, 50%, 77%, 19%, and 69%, respectively, increasing communication in your digestive system to obtain a balanced, energized, and harmonic environment. * †††

TFF3, Zonulin, CLDN1, CDH1, OCLN, and EREG also work together and contribute to gut repair and overall digestive health through a complex network. We saw an increase in TFF3, CLDN1, CDH1, OCLN and EREG production of 116%, 16%, 55%, 41%, and 58%, respectively. An exciting observation was that Zonulin production decreased by 19%. Stress can increase the production of Zonulin, which allows for increased intestinal permeability and digestive discomfort. Decreasing Zonulin allows for a more balanced and more selective intestinal wall, allowing the microbiome to stay healthy and balanced. * †††

MUC2 and GLP-2 production increased by 35% and 18%. They are part of the gut-restore mechanism and coordinate the complete gut-restoration cycle. Together they allow for balance, resilience, and vitality at the cellular level. * †††

The positive changes in the production of these peptides/proteins show that P84 provides foundational and comprehensive gut support through regulation, repair, and restoration from the intestinal lining all the way to the microbiome that lives within. * †††

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