CLINICAL SUPPORT



Superabsorbent Technology. Diverse Benefits to Health. A Patented New Generation of Supplements.

SAFETY PROFILE

The superabsorbent material featured in Superabsorbent Supplements is composed of polyacrylic acid polymer that yields a flowable, gel-like material when exposed to fluid. The superabsorbent material absorbs up to 65 times its weight in fluid in vitro.

Schematic of structural formula:

The actual polymer has many crosslinked polyacrylic chains that results in a three-dimensional, porous network that absorbs and traps fluid and ions contained in fluid.

The polyacrylic acid polymer in Superabsorbent Supplements is recognized as safe by global regulatory agencies.

The following determinations support its safe use by consumers:

- Inclusion in the Priority-Based Assessment of Food Additives (PAFA).
- Recognized by the Codex Alimentarius Commission of the World Health Organization (WHO) as a food additive.
- Not classified as hazardous by the Globally Harmonized System (GHS).
- Recognized as safe, non-toxic, and noncarcinogenic by the National Toxicology Program (NTP), International Agency for Research on Cancer (IARC), and Occupational Safety and Health Administration (OSHA).
- Included in the EU List of Authorized Food Additives and approved for use in food supplements. (EU 2023/440)

The superabsorbent material is also recognized as direct and indirect food additives permitted for human consumption by the FDA:

- Direct food additives: 21 CFR 177.1211(a)(2)
- Secondary direct food additives: 21 CFR 173.310
- Food treatment: 21 CFR 173.73

This is informative for the safe use in human consumption because the absorbent material can be in contact with the same gastrointestinal tissues when used as an additive in food as when used in **Superabsorbent Supplements**.

Numerous studies on safety are available in public literature that also support that the material is known to be biocompatible and safe, including but not limited to:

- Thompson, E., et. al., Lack of genotoxicity with acrylate polymers in five short-term mutagenicity assays; Environmental and Molecular Mutagenesis 14: 98-106 (1989)
- Lindenschmidt, R., et. al., Effects of oral administration of a high-molecular weight crosslinked polyacrylate in rats; Fundamental Applied Toxicology 17(1): 128-135 (1991)

SAFETY PRECAUTIONS

Superabsorbent polymers are capable of absorbing large amounts of fluid inside their porous, three-dimensional networks without dissolving or losing their structural integrity. Absorption by the polymeric material is governed by fluid penetration into the microscopic pores of the dry material. The polymer responds elastically with the mechanical dispersion of fluid through the material.

Superabsorbent polymers have been cleared by global regulatory agencies for numerous uses and indications including wound care, oral care, rectal care, transdermal systems, bioreversible lung plugs, spinal stents, ophthalmic applications, injectable polymeric systems, and numerous other uses on and within the body.

Superabsorbent technology for use in the gastrointestinal tract is a growing industry – with over a billion dollars invested in clinical studies to support safety and effectiveness.

As with anything that travels through the GI tract, there can be a risk of adverse abdominal effects such as abdominal distention or discomfort.

In general, data from clinical and non-clinical studies of the superabsorbent material in Superabsorbent Supplements supports that use of the material is low risk, safe for use, and safe for its intended use. Studies support that the probability of risk is low, and the severity of risk is low, with no long-term negative effects of use.

Any adverse events are expected. Any adverse events are generally dose dependent, mild to moderate, transient, reversible, and resolve without medical treatment or pharmacologic intervention.

Studies support that many people will not experience any adverse events from use of the superabsorbent material in **Superabsorbent Supplements**. Generally, use is well-tolerated.

In general, the most commonly observed adverse events were abdominal pain and abdominal distension.

Other adverse events that were infrequently or not observed but could possibly occur include:

- Nausea - Vomiting - Headache - Loose stools
- Diarrhea or constipation - Mucosal irritation - Flatulence - Belching
- Decreased appetite - Muscle cramps - Decreased and increased thirst

Any expected adverse events from concomitant illnesses should be considered separate and different from those adverse events related to use of the superabsorbent material. The superabsorbent material in **Superabsorbent Supplements** is not associated with and has not demonstrated any serious risks.

Zero calorie WeightWise makes you feel full.



SUPERABSORBENT SUPPLEMENTS

CLINICAL PERFORMANCE

WEIGHT WISE

The superabsorbent material in **Superabsorbent Supplements** is patented for numerous uses.

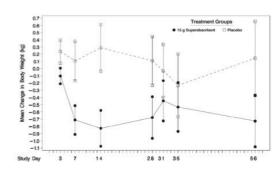
Each of the six products in the superabsorbent line is dedicated to one of these uses.

WeightWise becomes a non-digestible gel that travels naturally through the gastrointestinal route until it is excreted. The zero-calorie superabsorbent material is not metabolized by the body, unlike drugs and other supplements that may function by exerting chemical effects on the body that are associated with side effects that can often be severe.

Use of the superabsorbent material is not associated with any severe side effects like those that can be caused by popular weight loss drugs such as stomach paralysis or persistent nausea associated with drugs that inhibit digestive function.

WeightWise Supplements provide a drug-free pathway to feeling full and experiencing satiety.

Body weight change was measured a double-blind, randomized, parallel, placebo-controlled study for eight weeks. Body weight change was significant at Weeks 1 and 2 (P=0.0140 and 0.0039, respectively) using repeated measures analysis of covariance of change in body weight. The P-values at Week 4 and Week 8 were 0.0660 and 0.2116, respectively, for the superabsorbent. Weight loss was significantly greater in the superabsorbent group than the placebo group at Week 1 (-0.71 + 1.5 kg vs. 0.11 + 2.0 kg, P = 0.014) and at Week 2 (-0.83 + 1.8 kg vs. 0.29 + 2.3 kg, P = 0.004), and a trend toward greater weight loss in the superabsorbent group continued at Week 4 (P = 0.066) and Week 8 (P = 0.212).





SUPERABSORBENT SUPPLEMENTS

CLINICAL PERFORMANCE

FLUID MANAGER

The superabsorbent material in **Superabsorbent Supplements** is patented for numerous uses. Each of the six products in the superabsorbent line is dedicated to one of these uses.

Fluid Manager Supplements have been clinically demonstrated to absorb fluid from the body via the gastrointestinal route. The product works independently of kidney function and removes fluid from the body whether or not a person has functioning kidneys. The superabsorbent material supports a method and process for dialysis free fluid management.

New approach to fluid overload.

The superabsorbent material in **Fluid Manager Supplements** absorbs up to 65
times its weight in fluid. An increase in
fecal volume with a decrease in urinary
volume demonstrates the product supports
the management of fluid.

A strategy to support the management of fluid in real time could be useful all along the chronic kidney disease spectrum.

For example, fluid overload in between dialysis treatments is a common complication, affecting up to 40% or more of dialysis patients.

Use of **Fluid Manager Supplements** may provide value to numerous populations that experience excess fluid retention or edema.

Reducing unhealthy amounts of fluid in the body can lead to positive outcomes to health, including improvements in measures of fluid overload and other quality of life measures.

The superabsorbent material in **Fluid Manager Supplements** absorbs up to 65 times its weight in fluid.

In clinical studies, use of **Fluid Manager Supplements** resulted in clinical improvements in the signs and symptoms of fluid overload.

- Reductions in blood pressure, dyspnea on exertion, pulmonary rales, and peripheral edema in extremities.
- Decreases in body weight.
- Increases in distance walked in 6-minute walk test
- Improvements in Kansas City Cardiomyopathy Questionnaire (KCCQ) quality of life scores.
- Improvements in heart failure severity.
- Decreases in NYHA heart failure classification from Class III/IV to I/II.





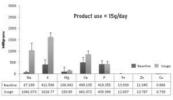
CLINICAL PERFORMANCE

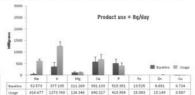
FLUID MANAGER

An open label, multiple dose study examining the effect of the product in people with end stage renal disease (ESRD) was conducted and had the following performance:

Fecal Content and Concentration of Cations

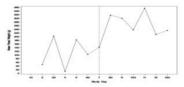
Large increases in fecal sodium and potassium content occurred after two weeks of supplementation. Fecal content of sodium and potassium increased in a dose-dependent manner, while decreases in urinary content of sodium and potassium also occurred.





Daily Average Fecal Weight

A mean increase from baseline in daily average fecal weight demonstrates the effectiveness of the product to absorb fluid from the body via the gastrointestinal route. Increases in fecal weight occurred within a day of supplementation.



Predialysis and Postdialysis Blood Pressure and Body Weight

In an open label, nonrandomized, multiple dose clinical study to assess the safety, tolerability, and efficacy of the product in people with ESRD who were maintained on 3-times/weekly hemodialysis, supplementation resulted in lower predialysis and postdialysis systolic and diastolic blood pressure as well as lower predialysis body weight during the supplementation period versus baseline.

		Product use: 15 grams/day (N=5)						
Parameter	Statistic	Predialysis			Postdiolysis			
		Baseline Period	Supplementation Period	Change From	Baseline Period	Supplementation Period	Change From Baseline DzingUsaje	
		Days 3-6 Daily Average	Days 10-13 Daily Average	Baseline During Usage	Days 3-6 Daily Average	Days 10-13 Daily Average		
	n	5	5		5	5	5	
Sitting Systolic	Mean	147.9	146.1	4.8	141.1	129.7	-11.3	
Blood Pressure (mmHg)	SD	10.91	16.36	12.11	15.42	17.75	12.15	
	Median	150.7	138.3	-5.7	139	125.3	-13.7	
	Min, Max	132, 157	135, 174	-12, 17	123, 162	105,148	-25,7	
	n	5	5	5	5	5	5	
Sitting Diastolic	Mean	83.5	83.3	-0.1	81.6	78	-3.6	
Blood Pressure	SD	9.85	4.71	6.98	9.72	14.94	6.89	
(mmHg)	Median	82	86.7	+0.3	77	70.7	-5	
	Min, Max	72, 97	77, 87	-10, 8	73, 94	64, 98	-10, 8	
Weight (kg)	n	5	5	5	5	5	5	
	Mean	91.86	90.79	-1.07	88.95	88.15	-0.79	
	SD	14.253	13.662	0.855	14.055	13,431	0.735	
	Median	94.17	92.5	-0.77	90.03	89.13	-0.67	
	Min, Max	70.4.107.5	70.0.105.3	-2.20.2	67.5.104.3	67.5.102.3	-2.0.0.0	

These statements not evaluated by the Food and Drug Administration. These products not intended to diagnose, treat, cure, or prevent any disease.

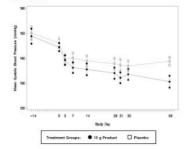
CLINICAL PERFORMANCE

FLUID MANAGER

A double-blind, randomized, parallel, placebo-controlled clinical study examining the effect of the product in people with heart failure and chronic kidney disease was conducted and had the following performance:

Blood Pressure

Subset analyses of people with baseline systolic blood pressure 130 mmHg revealed significant differences at Week 8 between product and placebo (p=0.019, systolic and p=0.012 diastolic) when using Repeated Measures Analysis of Covariance.



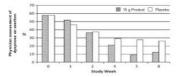
Heart Failure Detection: Changes in Neuroendocrine Markers

Frequency analysis of speople with NT-proBNP +1000 and 1000 pg/mL revealed a significant difference at Week 4 between product and placebo (p=0.0389) when using a chi-square test comparing proportions.

Study Visit	Variable	Product (N=59)	Placebo (N=52)	p-value	
Screening	NT-proBNP +1000 pg/mL	0 (0.0%)	1 (1.9%)	0.2846	
screening	NT-proBNP >1000 pg/mL	59 (100.0%)	51 (98.1%)	0.2846	
End of	NT-proBNP +1000 pg/mL	4 (8.5%)	0 (0.0%)	0.0389	
Week 4	NT-proBNP >1000 pg/mL	43 (91.5%)	48 (100.0%)		
End of	NT-proBNP +1000 pg/mL	5 (12.2%)	1 (2.2%)	0.0656	
Week 8	NT-proBNP >1000 pg/mL	36 (87.8%)	45 (97.8%)		

Dyspnea on Exertion

The frequency of marked or disabling exertional dyspnea by physician assessment decreased over time. The percentage of people reporting moderately or markedly better breathing by the 7-point Likert scale was 21.3% in the product group at Week 4 (P=0.5f7), and 36.6% (P = 0.127) at Week 8.



Peripheral Edema

A larger percentage of subjects who had peripheral edema at Baseline had an absence of peripheral edema at Week 8.

3.4	Product	Placebo
Patients with peripheral	26 (63.4%)	27 (58.7%)
edema present at Baseline and absent at Week 8	(N=41)	(N=46)

Improvements in NYHA Functional Classification (Heart Failure Class)

The difference in proportions of people with at least one class improvement from Baseline to Week 8 was significant in favor of the product (p=0.002)

NYHA Class	Product (N=59)	Placebo (N=52)	
II.	17 (41.5%)	6 (13.0%)	
SIII	24 (58.5%)	38 (82.6%)	
IV	0 (0.0%)	2 (4.3%)	

Subjects with at Least One Class Improvement from Baseline at Week 8	20 (48.8%)	8 (17.4%)
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Watch your salt. Just like the doctor ordered.



SUPERABSORBENT SUPPLEMENTS

CLINICAL PERFORMANCE

SODIUM MANAGER

The superabsorbent material in **Superabsorbent Supplements** is patented for numerous uses.

Each of the six products in the superabsorbent line is dedicated to one of these uses.

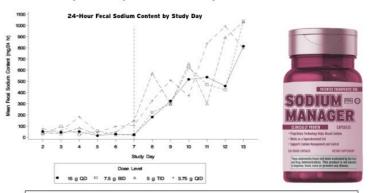
Sodium Manager absorbs and traps sodium in a non digestible gel until it is excreted from the body via the gastrointestinal route. The product provides a non-drug pathway to support sodium management.

There are numerous health benefits associated with lowering sodium including decreasing risk for heart disease and kidney disease, helping control diabetes, and reducing blood pressure.

Fecal Content of Sodium: Comparison of Baseline Period Versus Supplementation Period

Fecal Sodium (mg)	15g QD	7.5g BID	5g TID	3.75g QID
Baseline (Days 3-6	Daily Average)			
Mean	34.05	49.79	45.38	94.53
SD	25.055	52.962	51.952	81.025
Median	23.87	31.61	27.45	70.09
Min, Max	10.48, 80.25	8.39, 144.55	7.09, 148.40	16.73, 213.03
Supplementation (D	ays 10-13 Daily Av	rerage)		
Mean	581.32	638.79	720.08	747.57
SD	119.440	319.001	378.981	371.762
Median	580.44	471.50	708.24	768.04
Min, Max	404.19, 741.30	335.97, 1097.57	290.04, 1273.28	190.02, 1282.95
△ from Baseline to S	upplementation			
Mean	547.27	589.00	674.71	653.04
SD	111.521	280.577	338.774	347.788
Median	553.34	462.95	670.35	688.80
Min, Max	382.07, 715.72	290.14, 1023.7	1 282.95, 1124.88	3 112.10, 1069.92

The fecal content of sodium was measured in an open-label, parallel-group, randomized, multiple-dose study. Supplementation with the superabsorbent polymer was provided to four cohorts of six healthy adults each with 15g once daily (QD), 7.5g twice daily (BID), 5g 3 times daily (TID), or 3.5g 4 times daily (QID). The results of the study indicated an increase in mean fecal sodium content between the baseline period (days 3-6) daily average values and the supplementation period (days 10-13) daily average values in all cohorts. The greatest change was observed in the 5g TID cohort.



CLINICAL PERFORMANCE

CHOLESTEROL HELPER

The superabsorbent material in **Superabsorbent Supplements** is patented for numerous uses. Each of the six products in the superabsorbent line is dedicated to one of these uses.

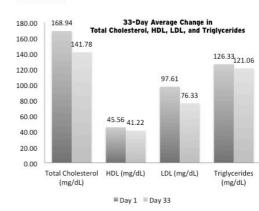
Cholesterol Helper becomes a nondigestible, non-caloric, three-dimensional gel that has characteristics of soluble fiber and supports cholesterol management through a non-drug pathway.

Soluble Superfiber

The thick gel of soluble fiber helps slow digestion, which keeps blood sugar from spiking and slows the absorption of fats.

There are numerous benefits to health associated with lower cholesterol, including improved heart health and decreased risk of type 2 diabetes. Reduced triglyceride levels can decrease risk of heart attack or stroke. Studies have consistently shown that lowering LDL cholesterol helps prevent heart disease and can slow or stop the buildup of plaque in blood vessels.

Total cholesterol, HDL, LDL, and triglyceride levels were measured in an open-label, randomized study to assess the safety, tolerability, and efficacy of the superabsorbent polymer. After 33 days of 15g daily use in adults with heart failure, total cholesterol changed 16%, HDL changed 10%, LDL dropped 22%, and triglyceride levels decreased by 4% on average. The product at a serving size of 15 grams/day was well-tolerated.





SUPERABSORBENT SUPPLEMENTS

CLINICAL PERFORMANCE

GLUCOSE MANAGER

The superabsorbent material in **Superabsorbent Supplements** is patented for numerous uses.

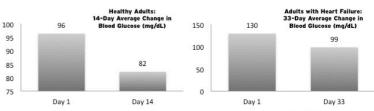
Each of the six products in the superabsorbent line is dedicated to one of these uses.

Glucose Manager becomes a nondigestible, non-caloric, three-dimensional gel that has characteristics of soluble fiber.

Blood Sugar Control

The thick gel of soluble fiber helps slow the emptying of the stomach, helps slow the passage of digestion, and helps slow the absorption of glucose which helps improve blood sugar levels. There are numerous benefits to health that are associated with managing blood sugar levels, including decreased risk of type 2 diabetes, heart disease, and kidney disease.

Glucose Manager provides a non-drug pathway to support healthy blood glucose levels. No other tools that support blood sugar management work the same way.



Blood glucose was measured in a study to assess the safety, tolerability, and efficacy of the superabsorbent polymer in healthy adults. After 14 days of 15g daily use, blood glucose levels decreased 15% on average.

Blood glucose was measured in a separate study to assess the safety, tolerability, and efficacy of the superabsorbent polymer in adults with heart failure. After 33 days of 15g daily use, blood glucose decreased 24% on average.

Blood glucose levels over 100 is an indicator of pre-diabetes, which can progress to type 2 diabetes if left unchecked. Keeping blood glucose levels within a safe range helps decrease the risk of more severe complications.



SUPERABSORBENT SUPPLEMENTS

CLINICAL PERFORMANCE

COLON HEALTH

The superabsorbent material in **Superabsorbent Supplements** is patented for numerous uses. Each of the six products in the superabsorbent line is dedicated to one of these uses.

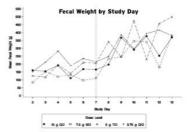
Colon Health becomes a non-digestible, non-caloric gel with characteristics of both soluble and insoluble fiber.

Poop better.

Soluble fiber absorbs water and softens stools, while insoluble fiber increases bulk. Increased bulk stimulates the natural contractions of the large intestine. Bulkier stools are softer and easier to pass, helping to prevent constipation.

Constipation is one of the most common digestive problems. Millions of people meet the diagnostic criteria for chronic constipation. Constipation not only affects quality of life, but diagnosis and treatment imposes a significant cost to the individual as well as the healthcare system.

Colon Health provides a drug free tool to help support constipation relief and gastrointestinal health.



Supplementation with the superabsorbent polymer was provided to four cohorts of six healthy adults each with 15g once daily (QD), 7.5g twice daily (BID), 5g 3 times daily (TID), or 3.5g 4 times daily (OID). Although day-to-day variability was apparent, mean fecal weight increased in all cohorts over 7 days of use compared to baseline, with the greatest increase (249g) observed in the 5g TID cohort.

Fecal Weight (g)	15g QD	7.5g BID	5g TID	3.75g QID
Baseline (Days 3-	6 Daily Average)			
Mean	155.79	124.79	165.63	229.29
SD	64.475	70.32	53.939	103.871
Median	154.25	106.13	158.38	215.63
Min, Max	87.50, 226.75	54.00, 225.00	94.50,247.00	114.50, 353.50
Supplementation ((Days 10-13 Daily Av	erage)		
Mean	322.38	311.67	414.5	370.92
SD	59.035	131,177	129.299	112.894
Median	312.5	280.38	451	374.63
Min, Max	248.00, 402.25	154.25, 472.00	214.50, 580.50	223.00, 535.25
∆ from Baseline to	Supplementation			
Mean	166.58	186.88	248.88	141.63
SD	73.849	70.033	105.088	92.555
Median	164.25	190.63	292.63	171.63
Min, Max	80.00, 296.75	89.50, 279.25	111.65, 342.75	13.50, 259.25



SAFETY PROFILE

Non-clinical safety testing included:

- Safety Pharmacology testing supports that consumption of the material has no effects on the nervous, renal, gastrointestinal, or cardiovascular systems.
- Pharmacokinetic test supports that the material is non systemic and not metabolized.
- Reproductive and Developmental Toxicity testing demonstrates no effects on male or female fertility.
- Repeat Dose Toxicity testing supports the safe use of the device material over time
- Effectiveness of the material for absorbing fluid in the gastrointestinal tract.



Animal testing for safety and effectiveness of the superabsorbent material was conducted in compliance with the principles of Good Laboratory Practice (GLP) and these standards:

US Department of Health and Human Services Food and Drug Administration – GLPs; 21 CFR Part 58 - Good Laboratory Practice Regulations for Nonclinical Laboratory Studies, Final Rule

Organization for Economic Co-Operation and Development (OECD): OECD Series on Principles of Good Laboratory Practice and Compliance Monitoring, Number 1. OECD Principles on Good Laboratory Practice (1997)

European Community (EC): EC Directive 99/11/EC of March 1999

Results from non-clinical safety testing support:

- Probability of risk is low, severity of risk is low, and the success of risk mitigation is high when the superabsorbent material is used to absorb fluid from the body via the gastrointestinal route.
- No long-term negative effects of use.
- Any potential adverse effects are mild, transient, and reversible.
- No deleterious effect on the gastrointestinal system.
- Well tolerated with no GI irritation or inflammation.
- Gastrointestinal function is not compromised.
- No effect on the central nervous system, cardiovascular system, renal system, or gastrointestinal system.
- No clinically relevant systemic symptoms observed.
- General state of health, body weight, food and water consumption, haematological and clinicochemical parameters were unaffected in male and female rats.
- No treatment-related effects in rats on male or female fertility or maternal or embryo/fetal toxicity.
- No treatment related effects on survival, ophthalmologic examinations, electrocardiography, organ weights, gross or microscopic pathology, or hematologic and urinalyses.
- The superabsorbent material has proved to be not genotoxic in vitro or in vivo. No gene mutations, chromosome damage, or cytotoxicity were observed.

NON CLINICAL PERFORMANCE

Extensive non clinical studies have been conducted with the superabsorbent material in **Superabsorbent Supplements** to assess performance.

Observations:

The superabsorbent material is capable of absorbing fluid via the gastrointestinal route, resulting in:

- An increase in fecal volume.
- An increase in fecal water content.
- A decrease in mean urinary excretion rate.
- A decrease in average daily urine output.

Fecal volume increases while urine volume decreases as a result of use. Further, urinary output decreased even with increased water intake. This measure thus supports that the superabsorbent material removes fluid from the body that would normally have been removed by the kidneys.

Performance data for effectiveness of the superabsorbent material in 5/6 nephrectomized rats showed:

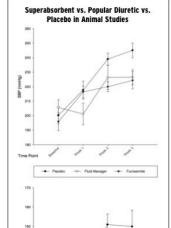
- Better control of fluid retention
- Absorption of water that would otherwise cause edema
- Increased survival time
- Control of serum electrolytes and uremic toxins

Use of the superabsorbent material in rats resulted in decreased the rate of rise of serum creatinine and allowed for 11 weeks extended survival time and return of BUN to normal in combination with 1/6th kidney function.

Performance data for effectiveness in a patient ESRD dog for 13 weeks showed:

- Better management of fluid than on hemodialysis alone
- Decreased rate of rise of urea
- Improvement in blood pressure

Non clinical pharmacology data demonstrated that the superabsorbent material absorbs sodium and potassium. Non clinical safety data showed that the material was not genotoxic, was not associated with adverse effects in safety studies of the central nervous system, cardiovascular, gastrointestinal, or renal systems, and was not associated with adverse effects or abnormal pathology in dogs or rats.



In a study conducted to determine the effects of the superabsorbent material in Superabsorbent Supplements and furosemide on blood pressure on spontaneously hypertensive (SHR) rats. The superabsorbent material showed control of systolic blood pressure similar to furosemide and control of diastolic blood pressure that was better than furosemide. Both were better than placebo.

Although intake of energy was the same in all groups, superabsorbent-fed rats decreased their body weight by about 10 grams over three weeks while both the control group and the furosemide group gained over 40 grams.



Animal testing for safety and performance was conducted in compliance with the principles of Good Laboratory Practice (GLP).

THANK YOU

contact@bh-biotechnologies.com









Watch your fluid.



Watch your salt.



Watch your cholesterol



Watch your sugar.



Replace dialysis.

Superabsorbent Technology. Diverse Benefits to Health. A Patented New Generation of Supplements.