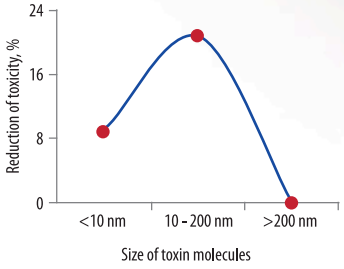
ENTEROSGEL®
Detoxifying agent

USES IN NEPHROLOGY AND UROLOGY

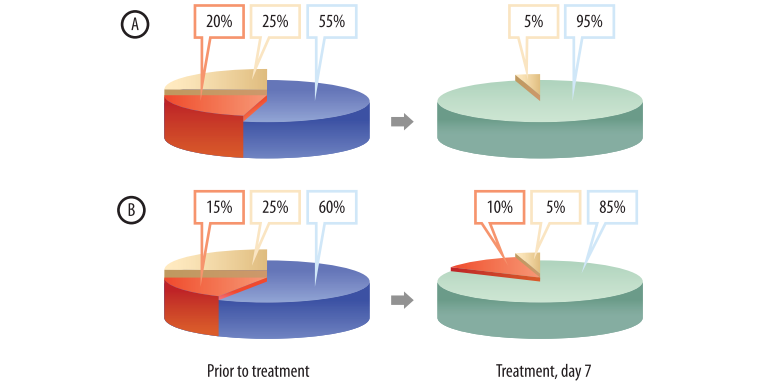
One way of elimination of uremic toxins from the body is via the digestive tract (in chronic renal insufficiency, the importance of digestive tract as to eliminate toxic substances rises significantly). However, the toxins being released into the enteral lumen are re-entering the internal environment of the organism [E.A. Friedman, C. Giordano, Sparks R.C. et al.]. Being present in the enteral lumen, Enterosgel binds toxic metabolites and uremic toxins (Fig. 3) [9d]*, prevents their re-absorption and interrupts the cycle of toxic metabolites and other harmful substances. The absorption of toxic molecules leads to release of albumin-binding ligands, which is confirmed by several studies [4b, 1d, 5g ,6g]. Therefore, the enterosorption with Enterosgel helps to maintain the detoxification function of serum albumin at an optimal sub-compensated level. It should be taken into account that the positive therapeutic effects are always individual, as the amount of Enterosgel, treatment regimen and duration of its administration may play the critical role. Enterosgel has a solid porous globular structure (like a sponge) with a defined set of pores, which allows to actively bind only the average molecular weight toxic substances and remove substances damaging the gut barrier from the intestinal lumen. Therefore, Enterosgel creates ideal conditions for the restoration of mucous membranes leading to a fuller recovery of the damaged epithelial layer (Fig. 1) [1g]. This results in augmentation of mucosal immune protection due to enhanced production of secretory IgA [7g] and, in turn, reduces the antigenic and toxic load on the immunocompetent and phagocytic cells and autosensitization, and helps to maintain the immune response in kidney disease patients [5d]. Owing to its high hydrophobicity, Enterosgel practically does not penetrate into the internal environment of the body through the intestinal barrier and is rapidly (within 7 hours) disappearing from the gastric and intestinal tract along with taken toxic substances. A high biocompatibility of Enterosgel enables its use for a very long time (up to several months), as compared to any other sorbents. The possibility of a prolonged use makes Enterosgel an indispensible detoxication agent in patients with chronic renal insufficiency. Being included in the therapy of renal insufficiency, Enterosgel is effective in arresting not only the intoxication syndrome, but also the other manifestations of the disease, such as the abdominal or dysuric syndrome and the temperature response (Fig. 4) [1d, 4d].

Figure 1 **Enterosgel decreases plasma levels of the average molecular weight toxins in patients with pyelonephritis.**



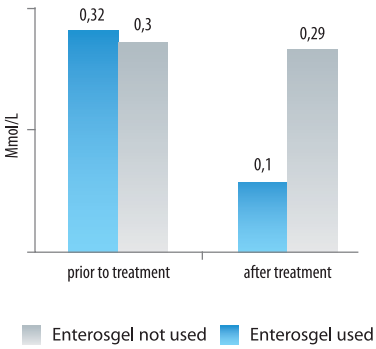
Unlike the control group patients, the Enterosgel-treated patients showed a significant reduction of the amount of toxins, as well as reduced toxicity of substances with the molecule size of less than 10 nm and from 10 to 200 nm, which remained in peripheral circulation as free (unbound) or bound to protein forms [1d].

Figure 2 **Enteral detoxification using Enterosgel reduces the level of leucocyturia in patients with bacterial kidney diseases.**



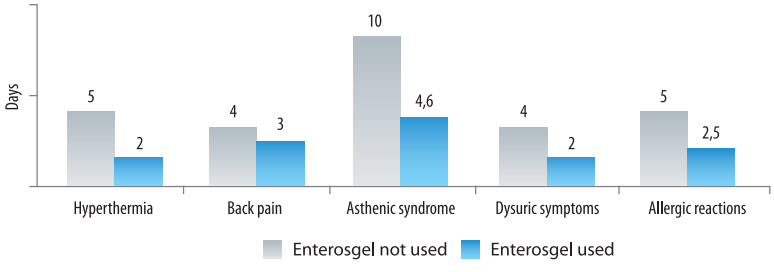
In patients with bacterial kidney diseases Enterosgel significantly accelerated the arrest of the astheno-vegetative syndrome and dysuric symptoms, as judged by normalization of values of complete blood count and urine analysis (taken as main laboratory criteria of treatment efficacy) [4d].

Figure 3 **Enterosgel-induced reduction of serum creatinine in patients with chronic renal insufficiency.**



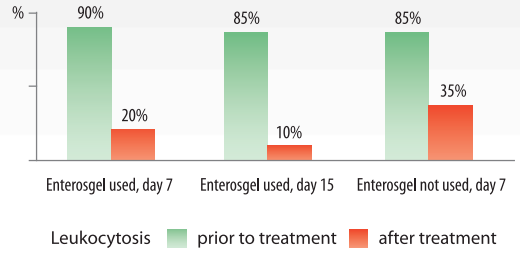
At the end of week 2-3 of combination treatment which included Enterosgel, there was a 3 - 3.5-fold reduction of serum creatinine concentration in patients with chronic renal insufficiency. In patients not treated with Enterosgel the improvement of their condition and functional renal parameters took longer, i.e., from 3-4 weeks to 1.5 months, and serum concentrations of urea and creatinine still remained at a higher level [9d].

Figure 4 **Dynamics of clinical symptoms in patients with bacterial kidney diseases.**



Enterosgel-treated patients with bacterial kidney diseases demonstrated the disappearance of the astheno-vegetative syndrome and dysuric symptoms significantly sooner, as well as the shorter periods of allergic process activity. The main laboratory criteria of treatment efficacy were normalization of values of complete blood count and urine analysis and disappearance of bacteriuria (Fig. 4) [4d].

Figure 5 **Dynamics of blood leukocyte levels in patients with bacterial kidney diseases.**



In Enterosgel-treated patients the values of complete blood count and urine analysis returned to normal, e.g., 20% of patients showed leukocytosis on day 7 of treatment, and 10% of patients on day 15 of treatment, versus 35% of patients with leukocytosis on day 7 in Enterosgel-non-treated patients (Fig. 5) [4d].

In Enterosgel-treated patients the complete blood count values returned to normal on day 8 ± 2, whereas in 63% of Enterosgel-non-treated patients the ESR remained elevated on day 14 from the beginning of treatment [4d].

In patients with mild kidney impairment caused by bacterial infection the Enterosgel treatment course can take about 10 days, while in patients with moderate kidney disease the treatment course should last up to 15 days. For patients with severe kidney disease the duration of Enterosgel treatment and its dose are selected individually.

Enterosgel administration as a part of combination treatment of chronic cystitis in children led to more rapid normalization of urine analysis values. Enterosgel was used for instillations into the urinary bladder along with dioxydine.

The intra-bladder therapy of chronic cystitis in children using Enterosgel led to a more rapid disappearance of leukocyturia (Fig. 6) as compared to children who were instilled with dioxydine only, without Enterosgel. Using Enterosgel in combination with other drugs for urinary bladder instillations allowed a two-fold reduction of concentration of the co-administered uroantiseptics and antibiotics, and consequently the attenuation of their irritating effect on the urinary bladder mucosa. Enterosgel use in treatment of various endoscopic types of chronic cystitis led to a more rapid disappearance of leukocyturia. On the whole, the disappearance of the leukocyturia takes place twice as fast when Enterosgel is used for instillations as compared to treatment with 1% dioxydine solution only [10d].

Figure 6 **Urinary bladder instillation. Timeline of the leukocyturia values normalization depending on various morphological types of chronic cystitis.**

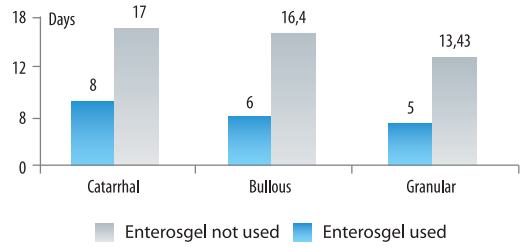
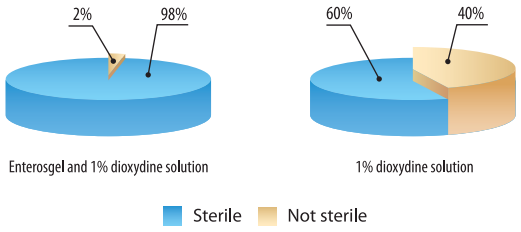


Figure 7 **Urinary bladder instillation. Microbiological parameters.**



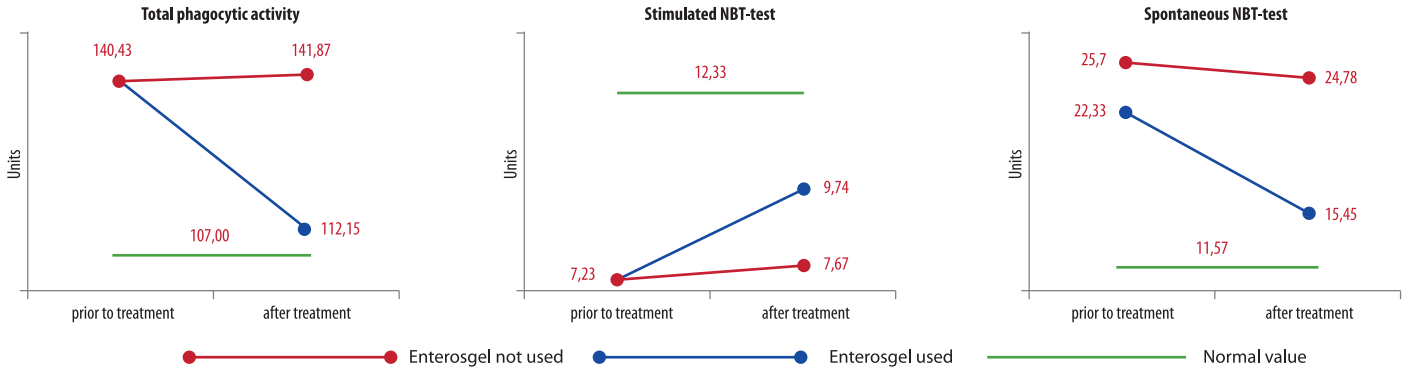
After a course of instillations the urine was sterile in 98% of patients treated with the combination of Enterosgel and dioxydine, and in 60% of patients treated with dioxydine solution only. In other cases there were either changes of the microflora or reduction of the number of cultured bacterial colonies (Fig.7) [10d]. Regardless of the systemic antibacterial therapy conducted, in the group of patients receiving Enterosgel bacteruria disappeared at least two times faster than in the patient group which lacked the Enterosgel treatment.

The following regimen of topical treatment of chronic cystitis in children is recommended: solution for one instillation comprises Enterosgel (20 mL) mixed in the same syringe with 1% dioxydine solution (20 mL) before instillation into the urinary bladder, 10—14 instillations per a course of treatment.

Enterosgel promotes maintenance of a healthy functional immune system

Endogenous intoxication is one of the main causes of reduced antimicrobial resistance in children with kidney inflammatory diseases. Acute pyelonephritis in children is accompanied by the inability of phagocytic cells to form an adequate functional response to microbial infection. In such cases the detoxifying action of Enterosgel has a favorable effect on phagocytic cell function in children with acute pyelonephritis (Fig. 8) [5d].

Figure 8



The Enterosgel-treated children showed a trend towards normalization of the phagocitic innate immunity which activity was hitherto reduced by 20%. The normalization of phagocytic capacity of neutrophil granulocytes (NG) favorably affects their activity at the subsequent stages of phagocytosis and increases the phagocytosis completeness. No significant changes of phagocytic activity have been eventually found in patients who did not receive Enterosgel treatment.

After completion of the treatment course which included Enterosgel, children in the main group showed a 44.53% reduction of activity of neutrophil granulocytes ($p < 0.05$) in spontaneous nitro blue tetrazolium (NBT) reduction test as compared to baseline values. This attests that the NG functional activity was preserved at sub-compensated level following Enterosgel administration. No significant changes of the above parameters have been found in patients from the control group who received the traditional treatment.

*4b,1d, 4d, 5d, 9d, 10d, 1g, 5g, 6g, 7g - The texts of these articles can be found in the collected publications on Enterosgel.

Contact details:
Bioline Products s.r.o., Tel/Fax: +420 266 317 783, +420 608 837 907, E-Mail: info@enterosgel.eu, www.enterosgel.eu