

**Human small intestinal motor activity and postprandial glycemia after dietary fiber intake.** C Cherbut, S Bruley des Varannes, M Schnee, MF Lucas, JP Galmiche, J Delort-Laval (*INRA, GIS Nutrition Glucidique, BP 527, 44026 Nantes Cedex 03, France*)

The regulatory effect on digestive transit time by dietary fiber (DF) has been mainly attributed to its action in the colon. However, DF may also change motility in the small intestine and improvement of glucose tolerance may be related to that action. The aim of this study was to clarify the relationship between the motor activity of the small intestine and glycemia after ingestion of 3 different DF.

Electromyographic activity in the first 100 cm of the small intestine was recorded 4 times in 6 healthy volunteers with a probe fitted with 8 pairs of annular electrodes which were spaced 10 cm apart (Kolrep-Dechauffour *et al*, 1989). Five min after the end of phase 3 (P3), the subjects ingested either 125 ml glucose 20% alone (GL) or GL + 15 g of either wheat bran fibers (WB), sugar beet fibers (SB) or ispaghula fibers (IS). The DF had the following properties:

A global motility index was automatically calculated by dividing the quantity of postprandial electrical activity by the mean quantity of activity per min within the preprandial phase 3. Postprandial peristaltic events were characterized by their frequency, duration and propagation velocity and distance. Blood glucose was analyzed at 15-min intervals. Data were compared by variance and regression analyses.

**Table I.** DF properties.

	<i>Soluble fiber (%)</i>	<i>Water-holding capacity (g/g)</i>	<i>Particle size (mm)</i>
WB	15	5	0.64
SB	22	18	0.57
IS	10	12	0.68

The motor activity of the small intestine in response to a glucose meal was changed by DF. SB and IS reduced the motility index and the stationary electrical activity in the small intestine. In addition, SB and IS induced more rapid and greater propagation of peristaltic activity and caused a lower postprandial glycemic response than GL and WB. The postprandial glycemic responses were significantly correlated with the global motility index ( $r = 0.76$ ) and stationary electrical activity ( $r = 0.77$ ). GL and IS induced a later occurrence of the first post-prandial P3 than either SB or WB. Thus, the reduction of postprandial glycemia by IS and SB was independent of the time of occurrence of the first postprandial P3.

The reduction of postprandial glycemia induced by SB and IS may be correlated with an inhibition of the stationary electrical activity. In addition, SB and IS increased the propagation of peristaltic activity. The mechanism of action on the small intestinal motility for DF may lie in its water-holding capacity.

### Reference

- Kolrep-Dechauffour S, Cherbut C, Bruley des Varannes S, Guiheneuc P, Galmiche JP (1989) *Gastroenterol Clin Biol* 13, 602-606