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MEETING ABSTRACT

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Investigation of European medicinal plants to influence small intestinal motility *in vitro*

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Background: For millennia plants have been used for medicinal purposes. We investigated extracts of 10 plants traditionally used in Austria against gastrointestinal complaints, whether alterations of small intestinal motility might contribute to their apparent beneficial effects. The choice was based on the list of plants published by Vogl *et al.* [1] as well as Wichtl *et al.* [2] and Bradley [3].

Methods: The following herbs were investigated: *Melissae folium*, *Origani herba*, *Betonicae herba*, *Angelicae radix*, *Levistici radix*, *Imperatoriae radix*, *Petroselinii radix*, *Ribis nigri folium*, *Euphrasiae herba*, and *Chelidonii herba*. Additionally, *Belladonnae folium* was used as a positive control. Extracts were prepared with 60% ethanol (v/v) using accelerated solvent extraction or the Soxhlet method, and dried under nitrogen. For the motility experiments, segments of guinea-pig ileum were mounted longitudinally in organ baths containing Tyrode solution gassed with 95% O₂/5% CO₂. Motor responses of full-thickness strips were recorded under isotonic conditions, whereas longitudinal muscle/myenteric plexus (LMMP) preparations were mounted under isometric conditions and stimulated electrically at 0.05 Hz. Such a stimulation has been shown to yield regular contractions that are mostly cholinergic in nature. The dried extracts were reconstituted in 50% DMSO (v/v) in distilled water at 20 mg/ml and further diluted with distilled water as needed. All preparations were first stimulated with a maximally effective concentration of bethanechol (100 μM) followed by increasing concentrations of extracts. Changes in tension were evaluated as % of the response to bethanechol for unstimulated ileal preparations and as % change of the response to electrical stimulation before drug addition in the case of electrically stimulated LMMP strips. Finally, all extracts were analysed by thin-layer chromatography using the methods published in the European Pharmacopoeia (8th edition 2014).

Results: The various extracts at final concentrations of 12.5–200 μg/ml did not evoke any significant dose-dependent ileal contractions nor did they inhibit the electrically evoked contractions to a meaningful extent. Only the *Belladonna* extract inhibited electrically evoked contractions by approximately 90% already at a concentration of 6.25 μg/ml. The chromatographic analysis showed that the extracts contained characteristic ingredients as described in the European Pharmacopoeia.

Discussion: The results show that none of the tested extracts directly influences small intestinal motility except for *Belladonna*, which inhibited the electrically evoked contractions as expected. This, however, does not imply that these herbs are useless against gastrointestinal complaints because *in vivo* several additional modes of actions can come into effect. Alterations of bile secretion, intestinal water and electrolyte transport or carminative actions have been

shown to underlie the beneficial effects of a number of medicinal herbs used against gastrointestinal problems. Furthermore, in many instances fresh herbs or tea preparations are administered, which may contain compounds that are not recovered in an ethanolic extract.

References

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