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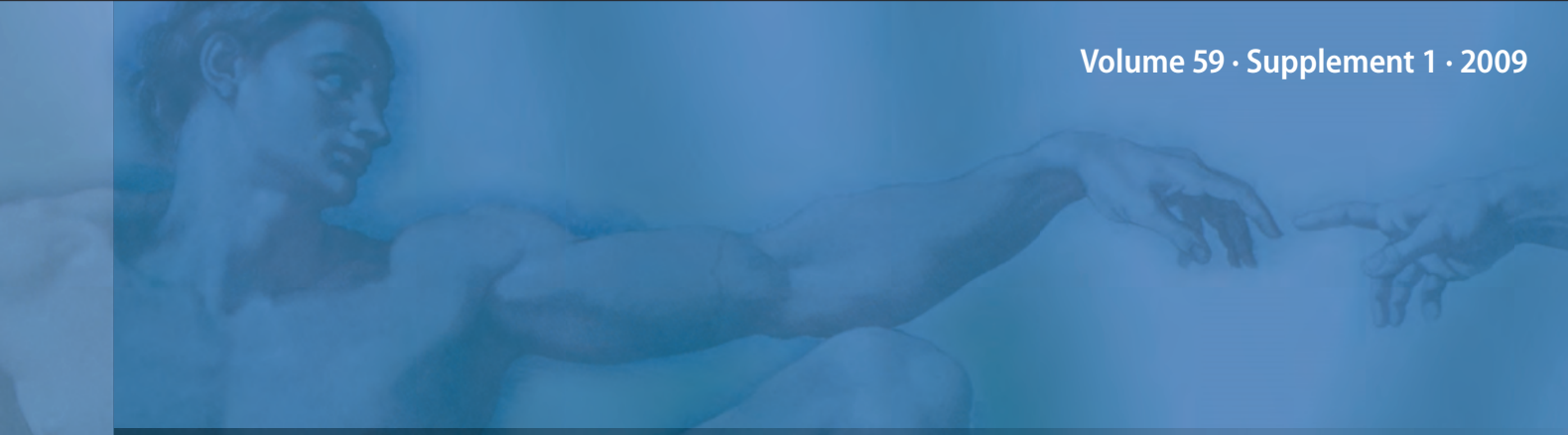

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EFFECT OF INHALATION ALCHOLIC EXTRACT OF PEGANUM HARMALA ON INDUCTION OF ANXIETY LIKE BEHAVIOR IN ELEVATED PLUS-MAZE

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Introduction: Based on the extensive application of *Peganum harmala* (P.h) seeds in the Asian traditional medicine, we tried to investigate its possible anxiety effect.

Method: The effect of P.h. extract inhalation was evaluated in adult male rats using elevated plus-maze apparatus. The humidity of prepared ethanol extract was 37%. Animals in different groups (n=6) received 2, 4, 6, 12 or 18 gr/ml doses of the extract using Nebulizer. harmaline drug (0.13 gr/ml) was used as positive control drug.

Results: Compared with saline treated group, harmaline as the positive control significantly caused fear in rats as it was shown by increased time spent in closed arm of plus-maze ($p< 0.05$). Also, ethanol extract of P.h was able to show anxiety effect at doses 6, 12 and 18 mg/ml ($p <0.05$).

Conclusion: Our data showed effective anxiety effect of ethanol extract of *Peganum harmala*. Its effect should be considered in the context of its extensive usage in the men daily life. More studies are required to elucidate its mechanism and site of action.

Keywords: *Peganum harmala*, Fear, Harmaline, Inhalation, Elevated Plus-Maze

P4PM-12-29

QUANTITATIVE EVALUATION OF STOCHASTIC RESONANCE AS A MATHEMATICAL MODEL OF ELECTROGASTROGRAPHY DURING SUPINE POSITION

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It is clinical importance to record and analyze electrogastrography(EGG), which provide more information on the propagation and co-ordination of gastric contractions. In this study, by measuring the gastrointestinal motility, we aim to obtain a mathematical model of EGG during supine position and then speculate factors to describe the diseases resulting from constipation and erosive gastritis.

Initially, we applied the Wayland algorithm to the EGG in order to measure the degree of determinism.As a result, we could not decide whether or not a chaotic process is appropriate for the mathematical model of the EGG. On the other hand, the waveform of the electric potential in the interstitial cells of Cajal (ICCs) is similar to the graphs of numerical solutions to the van der Pol equation. Hence, we added the van der Pol equation to a periodic function and random white noises named after the intestinal motility and other biosignals. We converted the stochastic differential equations into difference equations. The EGG and numerical solutions were compared and evaluated on the basis of the translation error in the Wayland algorithm and the maximum Lyapunov exponent. The EGG was well described by the stochastic resonance in the stochastic differential equations.

P4PM-12-30

REGULATION OF GASTRIC EMPTYING RELATED TO NUCLEOTIDES AND PURINOCEPTORS IN RAT PYLORIC SPHINCTER

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Regulation of gastric emptying is coordinated with antrum (A), pyloric sphincter (PS) and duodenum (D). The relaxation of PS is one of the most important factors for promoting gastric emptying. However, little is known about the role of inhibitory neurotransmitter in the regulation of PS and gastric emptying. In this study, we investigated the effects of ATP and adenosine on the carbachol-induced contractions in A, PS and D. We also studied whether nitric oxide and purinoceptors related to gastric emptying. Methods: Isometric tension was recorded via computer-based analysis using Mac-Lab. The levels of nucleotides were measured by HPLC analysis. Levels of expression of P2 receptors were studied by Western immunoblot. Results: 0.1mM N^G-nitroarginine(NOARG) cause contraction in PS and D. 1mM ATP and 0.01 mM ADPβS caused relaxation in PS but not in A and D. These relaxation were inhibited by the P2Y(1)-selective antagonist, 0.01 mM MRS2179. The level of nucleotides contents gradually decreased along the gastrointestinal junction, but adenosine content in PS was the same as in A. The level of P2X(4) were most expressive in gastrointestinal junction. P2Y(1) receptors were visualized in PS. P2Y(1) receptors mediate relaxation, largely through NO in gastrointestinal junction.

P4PM-12-31

DISTRIBUTION AND ORIGIN OF GABAergic NERVE TERMINALS IN THE SUPERIOR SALIVATORY NUCLEUS; IMMUNOHISTOCHEMICAL AND RETROGRADE TRACING STUDY

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The superior salivatory nucleus (SSN), the primary parasympathetic center for the submandibular salivary secretion, is located in the lateral reticular formation of the medulla oblongata. Our recent electrophysiological studies have demonstrated that inhibitory control of the activity in rat SSN neurons is exerted by GABA. However, little is known about the distribution of GABAergic neurons which innervate the SSN. In this study, we examined the distribution of GAD-containing nerve fibers and $GABA_A$ receptors immunohistochemically, in combination with identification of the SSN neurons with FluoroGold (FG) tracing method. As the result, the SSN neurons made contact with many GAD-positive nerve terminals, and contained $GABA_A$ receptors. In the next step, FG was injected into the SSN to identify the origin of GAD-positive nerve terminals. We found numerous FG-positive neurons in the forebrain and brainstem. In the lateral hypothalamus and central nucleus of the amygdala, FG-positive neurons rarely contained GAD. However, FG- and GAD-positive neurons were occasionally observed in the reticular formation of the brainstem. These findings suggest that preganglionic parasympathetic neurons in the SSN mainly receive GABAergic projection from the reticular formation.

P4PM-12-32

ENHANCEMENT OF COLORECTAL MOTILITY BY GHRELIN, BUT NOT DES-ACYL GHRELIN, THROUGH AN ACTIVATION OF LUMBO-SACRAL DEFECATION CENTER IN RATS

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Ghrelin is a 28-amino acid octanoylated peptide hormone that produced mainly in the stomach. Its best-documented effects are to increase food intake and to stimulate growth hormone release. We have previousely reported that a centrally penetrant ghrelin receptor agonist causes strong propulsive contractions on colorectum in rats. The response is generated though an activation of defecation center at the lumbo-sacral cord (L6-S1). In the present study, we examined the role of acylation of the ghrelin peptide in the stimulatory effect on colorectal motility. Rats were anaesthetised with α-chloralose and ketamine, and colorectal intraluminal pressure and propelled intraluminal liquid volume were recorded in vivo. Intrathecal application of acylated ghrelin at L6-S1 region of spinal cord, but not intravenous application, elicited propulsive contractions of the colorectum in a dose-dependent manner. In contrast, des-acyl ghrelin applied at L6-S1 failed to enhance colorectal motility. Des-acyl ghrelin showed a transient antagonistic effect on acylated ghrelin. It is concluded that acylation of the ghrelin peptide is essential to promote propulsive contractions of the colorectum.

P4PM-12-33

INHIBITORY ACTION OF HERBAL MEDICINE "DAI-KENCHU-TO" TO THE CONSTIPATION INDUCED BY MORPHINE IN RATS

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Morphine is thought to inhibit gastrointestinal transit and makes constipation.

The colon motility of male Wistar rats was examined *in vivo* and *in vitro*.

Intravenous administration of morphine significantly depressed the colonic motility *in vivo*, and the inhibitory effect lasted for about 4 hours. On the contrary, the colonic motility *in vitro* restarted after the dissection and did not show significant depression. The direct administration of morphine (750 μg/ml) and naloxone (100 μg/ml) in Kreb's solution did not affect colonic motility *in vitro*. These results suggest that the mechanism of the inhibitory effect of morphine (i.v.) on the colonic motility involves indirect action of the central or autonomic nervous system, and possibly by the activation of the sympathetic nervous system.

In the chronic morphine administration study, morphine hydrochloride was injected subcutaneously once a day for 2 weeks in male Wistar rats. Their body weights and amounts of feces were less than those of intact rats.

Administration of Herbal medicine "Dai-Kenchu-To (TJ-100)" improved the reduction of body weight and feces.

Morphine inhibits gastrointestinal transit and "Dai-Kenchu-To (TJ-100)" might restrain the suppression.