



References on the Administration of Gastrin
Using ALZET® Osmotic Pumps

- Q9237:** S. G. Galvin, *et al.* Peptidomics of enteroendocrine cells and characterisation of potential effects of a novel preprogastrin derived-peptide on glucose tolerance in lean mice. *Peptides* 2021;140(170532)
Agents: Gastrin-releasing peptide **Vehicle:** BSA; **Route:** SC; **Species:** Mice; **Pump:** 2004; **Duration:** 4 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (C57BL/6 N J Mice, male); p59-79; peptides; dependence;
- Q9460:** W. Sheng, *et al.* Hypergastrinemia Expands Gastric ECL Cells Through CCK2R(+) Progenitor Cells via ERK Activation. *Cellular and Molecular Gastroenterology and Hepatology* 2020;10(2):434-449 e1
Agents: Gastrin; U0126 **Vehicle:** Not Stated; **Route:** SC; IP; **Species:** Mice; **Pump:** 2006; 1002; 1007D; **Duration:** 1 week;
ALZET Comments: Dose (240 nmol/kg/day Gastrin; 25 mmol/kg U0126); Controls received mp w/ vehicle; dependence;
- Q5844:** X. Jiang, *et al.* Gastrin stimulates renal dopamine production by increasing the renal tubular uptake of L-DOPA. *American Journal of Physiology Endocrinology and Metabolism* 2017;312(1):E1-E10
Agents: RNA, small interfering (Gastrin-specific) **Vehicle:** TransIT in vivo transfection reagent; **Route:** Kidney (subscapular space); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;
ALZET Comments: Controls received mp with mock (nonsilencing) siRNA; ALZET polyethylene tubing used; Dose (3 ug/day)
- Q4918:** M. Zhang, *et al.* Growth factors and medium hyperglycemia induce Sox9+ ductal cell differentiation into β cells in mice with reversal of diabetes. *pnas* 2016;113(3):650-655
Agents: Gastrin; epidermal growth factor, human recombinant **Vehicle:** Acetic acid; PBS; **Route:** IP; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ vehicle; (male, WT or Ins1 CreERT); Dose (gastrin 3 ug/kg/hr; EGF 10 ug/kg/hr);
- Q3878:** R. Feng, *et al.* Indian Hedgehog Mediates Gastrin-Induced Proliferation in Stomach of Adult Mice. *Gastroenterology* 2014;147(655-+)
Agents: Gastrin-17 **Vehicle:** PBS; **Route:** IP; **Species:** Mice; **Pump:** Not Stated; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (PC-ShH KO/GKO, 3 months old); immunology;
- Q6729:** K. M. Marshall, *et al.* The C-terminal flanking peptide of progastrin induces gastric cell apoptosis and stimulates colonic cell division in vivo. *Peptides* 2013;46(83-93)
Agents: Gastrin, amidated; Gastrin, non-amidated, glycine-extended; C-terminal flanking peptide **Vehicle:** PBS; BSA; **Route:** Not Stated; **Species:** Mice (knockout); **Pump:** 1002; **Duration:** 11 days;
ALZET Comments: Dose (2.5 nmol/kg/h (Gamide and Ggly); 10 nmol/kg/h (CTFP)); 0.1% BSA used; animal info (Gastrin knockout (GASKO) mice, male and female, 10-12 weeks old); peptides;
- Q1065:** A. Ferrand, *et al.* Stimulation of proliferation in the colorectal mucosa by gastrin precursors is blocked by desferrioxamine. *American Journal of Physiology Gastrointestinal and Liver Physiology* 2010;299(1):G220-G227
Agents: Gastrin, glycine-extended **Vehicle:** PBS; BSA; **Route:** IP; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 250-300 g); functionality of mp verified by serum levels; peptides
- P9593:** E. Mensah-Osman, *et al.* Regulated expression of the human gastrin gene in mice. *REGULATORY PEPTIDES* 2008;151(1-3):115-122
Agents: Gastrin-17 **Vehicle:** Not Stated; **Route:** IP; **Species:** Mice (transgenic); **Pump:** 1007D; **Duration:** 7 days;
ALZET Comments: Controls received mp w/PBS; peptides; animal info (hGasBAC, wt)
- P8736:** Y. Zavros, *et al.* Reduced pepsin a processing of sonic hedgehog in parietal cells precedes gastric atrophy and transformation. *Journal of Biological Chemistry* 2007;282(46):33265-33274
Agents: Gastrin-17, rat; gastrin-17 gly **Vehicle:** Not Stated; **Route:** IP; **Species:** Mice; **Pump:** 1002; **Duration:** 14 days;
ALZET Comments: Functionality of mp verified by plasma gastrin levels; peptides; animal info (C57BL/6 x 129/SV, G -/-, wt, 8 weeks old)



P8307: R. N. Jain, *et al.* Transcriptional profiling of gastrin-regulated genes in mouse stomach. *PHYSIOLOGICAL GENOMICS* 2007;29(1):1-12

Agents: Gastrin-17, rat **Vehicle:** Saline; BSA; **Route:** Not Stated; **Species:** Mice; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ vehicle; peptides; animal info (male, C57BL/6, GAS-KO, 8-10 wks old)

P9001: B. Stenstroem, *et al.* Is gastrin partially responsible for body weight reduction after gastric bypass? *European Surgical Research* 2006;38(2):94-101

Agents: Gastrin-17, synthetic rat **Vehicle:** Saline; BSA; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 months;
ALZET Comments: Controls received no treatment; functionality of mp verified by serum gastrin concentrations; long-term study; pumps replaced every 2 weeks; peptides; animal info (male, Sprague Dawley, 2 months old, 230 g, gastric bypass)

P7538: R. N. Jain, *et al.* Gene expression profiling of gastrin target genes in parietal cells. *PHYSIOLOGICAL GENOMICS* 2006;24(2):124-132

Agents: Gastrin, rat **Vehicle:** Saline; BSA; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ vehicle; replacement therapy (gastrin knockout); animal info (GAS-KO, male, 8-10 wk old); mp primed overnight in saline

P7906: N. Houli, *et al.* Mitogenic effects of both amidated and glycine-extended gastrin-releasing peptide in defunctioned and azoxymethane-treated rat colon in vivo. *REGULATORY PEPTIDES* 2006;134(1):9-16

Agents: Gastrin-releasing peptide, amidated; gastrin-releasing peptide, glycine extended **Vehicle:** PBS; **Route:** IP; **Species:** Rat; **Pump:** 2ML4; **Duration:** 4 weeks;

ALZET Comments: Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 250-350g); "All animals remained healthy during the 4 week experimental period and rats in the different experimental groups gained weight at the same rate."

P8926: G. L. Cui, *et al.* Gastrin-induced apoptosis contributes to carcinogenesis in the stomach. *LABORATORY INVESTIGATION* 2006;86(10):1037-1051

Agents: Gastrin-17 **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 8 weeks;
ALZET Comments: Controls received mp w/ PBS; functionality of mp verified by serum gastrin levels; pumps replaced; cancer (gastric); peptides; animal info (male, GAS-KO, 2 months old)

P7532: H. F. Helander, *et al.* Cell proliferation in the gastric epithelium of the ulcer rat. *SCANDINAVIAN JOURNAL OF GASTROENTEROLOGY* 2005;40(12):1386-1393

Agents: Thymidine; gastrin-17, synthetic rat **Vehicle:** Saline; BSA; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; 2ML2; **Duration:** 1, 2, 6, 13 days;

ALZET Comments: Controls received mp w/ agent and no induced ulcer; functionality of mp verified by plasma gastrin levels; multiple pumps per animal (2); animal info (female, Sprague-Dawley, 200-250 g); mp primed overnight in 37C s

P6493: I. Rooman, *et al.* Combined gastrin and epidermal growth factor treatment induces islet regeneration and restores normoglycaemia in C57Bl6/J mice treated with alloxan. *Diabetologia* 2004;47(2):259-265

Agents: Gastrin I, rat; epidermal growth factor, recomb. human **Vehicle:** DMSO; saline, physiological; acetic acid; BSA; **Route:** IP; **Species:** Mice; **Pump:** 1007D; **Duration:** 1 week;

ALZET Comments: Controls received no treatment; peptides; 8% DMSO

P7077: F. Lefranc, *et al.* Characterization of gastrin-induced proangiogenic effects in vivo in orthotopic U373 experimental human glioblastomas and in vitro in human umbilical vein endothelial cells. *Clinical Cancer Research* 2004;10(24):8250-8265

Agents: Gastrin-17 **Vehicle:** Saline; **Route:** CSF/CNS (intratumoral); **Species:** Rat (nude); **Pump:** 1002; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ vehicle; stability verified; cancer (glioma)

P6496: H. F. Helander, *et al.* Parietal cell density during gastric ulcer healing in the rat. *SCANDINAVIAN JOURNAL OF GASTROENTEROLOGY* 2004;39(1):20-26

Agents: Thymidine, (methyl-3H)-; gastrin-17, synthetic rat **Vehicle:** Saline; BSA; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; 2ML2; **Duration:** 1,2,6,13 days;

ALZET Comments: Functionality verified by plasma concentrations; pumps per animal (2); primed overnight saline



P6560: D. Chen, *et al.* Altered control of gastric acid secretion in gastrin-cholecystokinin double mutant mice. *Gastroenterology* 2004;126(2):476-487

Agents: Cholecystokinin-8S; cholecystokinin-8; gastrin-17 **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Duration:** 2,6 days;
ALZET Comments: Comparison of single SC gastrin-17 injection vs. mp; peptides; mp incubated overnight in 0.9% NaCl at room temperature prior to implantation

R0200: L. C. Samuelson, *et al.* Insights into the regulation of gastric acid secretion through analysis of genetically engineered mice. *Annual Review of Physiology* 2003;65(383-400)

Agents: Gastrin **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Pump:** Not Stated; **Duration:** 6 days;
ALZET Comments: Replacement therapy (gastrin deficient mice)

P5644: N. Poorkhalkali, *et al.* Cell kinetics of the oesophageal epithelium in the rat: Effects of hypergastrinaemia. *SCANDINAVIAN JOURNAL OF GASTROENTEROLOGY* 2003;38(1):14-19

Agents: Gastrin-17; thymidine **Vehicle:** Saline; BSA; radio-isotopes; 3H tracer; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; 2ML2;
Duration: 24 hrs; 6,9,15,17 days;

ALZET Comments: pumps replaced after 13 days in some groups; pumps per animal (2); gastrin dissolved in saline w/ BSA

P6078: Y. Huang, *et al.* Partitioning of aquaporin-4 water channel mRNA and protein in gastric glands. *Digestive Diseases and Sciences* 2003;48(10):2027-2036

Agents: Gastrin **Vehicle:** Saline; albumin; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 8 days;

ALZET Comments: Controls received mp w/ vehicle; peptides

P5406: M. Yao, *et al.* COX-2 selective inhibition reverses the trophic properties of gastrin in colorectal cancer. *British Journal of Cancer* 2002;87(5):574-579

Agents: Gastrin-17 **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: Controls received mp w/ vehicle; cancer; peptides; colorectal cancer

P5587: F. Lefranc, *et al.* Gastrin significantly modifies the migratory abilities of experimental glioma cells. *Lab. Invest* 2002;82(9):1241-1252

Agents: Gastrin **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 1002; **Duration:** 14 days;

ALZET Comments: controls received mp with saline; tissue perfusion (tumor resection cavity); cancer

P5572: A. J. FitzGerald, *et al.* Effects of amidated gastrin and glycine-extended gastrin on cell proliferation and crypt fission in parenterally and orally fed rats. *Digestion* 2002;66(1):58-66

Agents: Gastrin, glycine-extended **Vehicle:** saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: gastrointestinal mitogen

P5015: A. Kramer, *et al.* Regulation of daily locomotor activity and sleep by hypothalamic EGF receptor signaling. *Science* 2001;294(5551):2511-2515

Agents: Transforming growth factor- α ; Brain-derived neurotrophic factor; Vasoactive intestinal polypeptide; Peptide, histidine-isoleucine; Gastrin releasing peptide; Substance P; Neuromedin-C; Neurokinin A; Neuropeptide K; Neuropeptide Y; Somatostatin; Antrin; Cholecystokinin; Thyrotropin-releasing hormone; Neurotensin; Neuromedin N; **Vehicle:** CSF, artificial;

Route: CSF/CNS (third ventricle); **Species:** hamster; **Pump:** 2002; **Duration:** 18-22 days;

ALZET Comments: peptides

Q6808: A. Aly, *et al.* Short term infusion of glycine-extended gastrin(17) stimulates both proliferation and formation of aberrant crypt foci in rat colonic mucosa. *Int J Cancer* 2001;94(3):307-13

Agents: Gastrin-17, glycine-extended **Vehicle:** PBS; albumin, bovine serum; **Route:** IP; **Species:** Rat; **Pump:** 2ML4; 2ML1;

Duration: 1 week; 4 weeks;

ALZET Comments: Dose (10 nmol/kg/hr; 2/5 nmol/kg/hr); 0.1% BSA used; Controls received mp w/ vehicle; animal info (Young adult male Sprague-Dawley rats, 250-350 g in weight); Resultant plasma level Study 1a (control 57+/-6.1 pM, treated 730+/-139 pM); Study 1b (control 37+/-2 pM, 1-week 682+/-202 pM, 4-week 655+/-79 pM); Study 2 (control 43+/-4 pM, treated 349+/-36 pM); cancer (Colorectal);



- P4120:** J. Morisset, *et al.* Hormonal control of rat fetal pancreas development. *Biol. Neonate* 1999;75(327-336
Agents: Cerulein; Gastrin-releasing peptide; Pentagastrin; Gastrin-releasing peptide antagonist; Hydrocortisone; L-365,260
Vehicle: Saline; DMSO; Water; **Route:** SC; **Species:** Rat (pregnant); **Pump:** 2ML4; **Duration:** no duration posted;
ALZET Comments: peptides; L-365,260 is a CCKB receptor antagonist
- P4583:** L. Friis-Hansen, *et al.* Impaired gastric acid secretion in gastrin-deficient mice. *American Journal of Physiology Gastrointestinal and Liver Physiology* 1998;274(G561-G568
Agents: Gastrin-17 **Vehicle:** Saline; BSA; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 6 days;
ALZET Comments: Controls received mp w/vehicle; functionality of mp verified by plasma levels; peptides
- P3923:** Y. Kato, *et al.* Growth factor enhancement of intestinal function: dramatic response but lack of synergism. *J. Pediatr. Surg* 1997;32(1598-1600
Agents: Epidermal growth factor; Gastrin I, human synthetic **Route:** IV (jugular); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: controls received mp w/ saline; peptides; multiple pumps per animal (2) to infuse both agents simultaneously; recomb. human EGF used
- P3387:** S. Tsutsui, *et al.* Inhibition of gastrin-stimulated enterochromaffin-like cell proliferation and mucosal histamine production in the rat stomach by the somatostatin analogue octreotide. *Regul. Pept* 1995;57(175-182
Agents: Octreotide; Gastrin **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 9 days;
ALZET Comments: controls received mp w/saline; peptides
- P2838:** G. E. Feurle, *et al.* The role of CCK and its analogues in the organogenesis of the fetal rat pancreas. *Pancreas* 1995;10(3):281-286
Agents: MK-329; Immunoglobulin, antigastrin/CCK **Vehicle:** DMSO; Tween 80; NaCl; Serum, rat; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** no duration posted;
ALZET Comments: controls received mp with vehicles; immunoglobulin is monoclonal IgG
- P2164:** K. Szepeshazi, *et al.* Growth inhibition of estrogen-dependent and estrogen-independent MXT mammary cancers in mice by the bombesin and gastrin-releasing peptide antagonist RC-3095. *J. Natl. Cancer Inst* 1992;84(24):1915-1920
Agents: Bombesin; Gastrin-releasing peptide; RC-3095 **Vehicle:** Propylene glycol; Water; **Route:** SC; **Species:** mice; **Pump:** 2002; **Duration:** 10, 14, 17, 18, 33 days;
ALZET Comments: controls received mp with vehicle; pumps replaced day 16; peptides; RC-3095 is a bombesin antagonist
- P2413:** A. C. Petropoulos, *et al.* Effect of short-term treatment with gastrin and related peptides on gastrointestinal histamine H₂-receptors. *J. Pharmacol. Exp. Ther* 1992;262(2):624-631
Agents: Gastrin; Pentagastrin; Cholecystokinin-8S; Tiotidine **Vehicle:** Saline; **Route:** SC; **Species:** Guinea pig; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: peptides
- P2206:** A. Hajri, *et al.* Gastrin-releasing peptide: in vivo and in vitro growth effects on an acinar pancreatic carcinoma. *Cancer Research* 1992;52(3726-3732
Agents: Gastrin-releasing peptide **Vehicle:** Saline; **Route:** Not Stated; **Species:** Rat; **Pump:** 2002; **Duration:** 15 days;
ALZET Comments: controls received mp w/saline; cancer; peptides
- P2393:** D. Y. Dy, *et al.* SMS 201.995 inhibits in vitro and in vivo growth of human colon cancer. *Cancer Research* 1992;52(917-923
Agents: Octreotide; Gastrin **Vehicle:** Saline; **Route:** SC; **Species:** mice; **Pump:** 2002; **Duration:** 14-35 days;
ALZET Comments: controls received mp w/ saline; pumps replaced; stress/adverse reaction (ulceration); 2 pumps implanted;
- P2056:** E. Brenna, *et al.* Trophic effect of gastrin on the enterochromaffin like cells of the rat stomach: establishment of a dose response relationship. *Gut* 1992;33(1303-1306
Agents: Gastrin-17 **Vehicle:** Albumin; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 28 days;
ALZET Comments: functionality of mp verified by plasma levels; dose-response (table); pumps replaced every 7 days; peptides



P1908: A. P. N. Majumdar, *et al.* Gastrin affects enzyme activity and gene expression in the aging rat pancreas. *Experimental Gerontology* 1991;26(57-64

Agents: Gastrin-17 **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: no comment posted

P2053: B. Ryberg, *et al.* Gastrin stimulates the self-replication rate of enterochromaffinlike cells in the rat stomach. *Gastroenterol* 1990;99(935-942

Agents: Gastrin-17; Ranitidine **Vehicle:** Albumin, bovine serum; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 12 days;
ALZET Comments: functionality of mp verified by plasma levels; dose-response (table); pumps replaced on day 6; peptides

P1915: B. Ryberg, *et al.* Gastrin stimulates the self-replication rate of enterochromaffinlike cells in the rat stomach. *Gastroenterology* 1990;99(935-942

Agents: Gastrin-17; Ranitidine **Vehicle:** Albumin, bovine serum; **Species:** Rat; **Pump:** 2ML1; **Duration:** 12 days;
ALZET Comments: pumps replaced after 6 days; peptides

P1640: B. Ryberg, *et al.* Trophic effects of continuous infusion of [Leu15]-gastrin-17 in the rat. *Gastroenterology* 1990;98(33-38

Agents: Gastrin-17 **Vehicle:** Albumin; Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 28 days;
ALZET Comments: functionality of mp verified by blood levels; dose-response;pump replaced every 7 days; peptides

P1808: R. Hakanson, *et al.* Evidence that gastrin enhances 45Ca uptake into bone through release of a gastric hormone. *Regul. Pept* 1990;28(107-118

Agents: Gastrin-17; Ranitidine **Vehicle:** Albumin; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; 2ML2; **Duration:** 4 weeks;
ALZET Comments: pumps replaced weekly (2ML1) or every two weeks (2ML2); peptides

P1360: N. A. P. Majumdar, *et al.* Gastrin: levels and trophic action during advancing age. *American Journal of Physiology Gastrointestinal and Liver Physiology* 1988;254(G538-G542

Agents: Gastrin **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: dose-response (graph); functionality of mp verified by tissue levels; peptides

P0988: M. Z. Schwartz, *et al.* The influence of gastrin on gastrointestinal function. *J. Pediatr. Surg* 1986;21(12):1123-1127

Agents: Gastrin-17 **Vehicle:** Saline; **Route:** intestine; SC; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: controls received mp w/saline; mp connected to catheter in lumen; peptides; multiple pumps (2) per animal; intest. absorption study; tissue perfusion

P0892: M. Z. Schwartz, *et al.* Enhancement of small intestine absorption by intraluminal gastrin. *J. Surg. Res* 1986;40(421-425

Agents: Gastrin-17 **Vehicle:** Saline; **Route:** intestine (small intestine); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: controls received mp w/saline; mp connected to 2 catheters in the proximal stroma; tissue perfusion

P1247: M. Z. Schwartz, *et al.* Enhancement of small intestine function by gastrin. *J. Surg. Res* 1985;38(613-617

Agents: Gastrin-17 **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: controls received mp w/ saline; rat fetal small intestine segment implanted sc in Fisher strain recipient;

P0297: J. Lamote, *et al.* Effect of cholecystokinin-octapeptide, caerulein, and pentagastrin on epithelial cell proliferation in the murine gallbladder. *Gastroenterology* 1982;83(371-377

Agents: Caerulein; Pentagastrin **Vehicle:** Saline; **Route:** SC; **Species:** mice; **Pump:** 2001; **Duration:** 6 days;
ALZET Comments: compared acute injec. w/mp infusion; peptides

P0092: S. Hosoda, *et al.* *Pracomys (Mastomys) natalensis*: animal model for study of histamine-induced duodenal ulcers. *Gastroenterology* 1981;80(1):16-21

Agents: Gastrin I, human synthetic; Tetragastrin; Histamine dihydrochloride; Pentagastrin **Vehicle:** Sodium bicarbonate; Water; **Route:** SC; **Species:** Rat; **Pump:** 1701; **Duration:** no duration posted;
ALZET Comments: 7 days histamine (no vehicle listed), 2 days peptides; comparison of agents inducement of ulcers; 1-2 pumps/animal