Apc-Min

Stain Name： B6/JGpt-*Apc*$^{em1Cin\ (Min)}$/Gpt

Strain Type： Targeted Mutation Cas 9

Strain ID： T001457

Background： C57BL/6JGpt

Description

APC (adenomatosis polyposis coli) encodes a tumor suppressor protein that acts as an antagonist of the Wnt signaling pathway. Apc-β-catenin-TCF mediated Wnt pathway dysregulation is the main pathway for the development of family adenomatous polyposis. Deletion or reduction of the expression of APC protein may lead to β-catenin from being degraded, allowing free β-catenin to accumulate in the cytoplasm and enter the nucleus, activating the relevant target oncogene, leading to the occurrence of cell carcinogenesis [1-3]. APC protein are also involved in other biological regulatory processes, including cell migration and adhesion, transcriptional activation, and apoptosis[4].

Apc-Min (Min: multiple intestinal neoplasia) mutant mouse specifically refers to C57BL/6J mice in which the amino acid at position 850 of the Apc gene is mutated. The 850th amino acid of the Apc gene was mutated from Leu to a stop codon, resulting in early termination of translation. The Apc-Min mouse strain was genetically edited on C57BL/6 background and the homozygous line could not survive. Under high-fat diet, male and female heterozygous mice have obvious intestinal adenomas and are more numerous, more common in the ileum and jejunum. Therefore, the Apc-Min mouse model is an ideal intestinal tumor model.

Application

1. Cancer Research: Gastrointestinal Tumors or Adenomas.

2. Screen to small-molecule drugs of tumor.

Identification

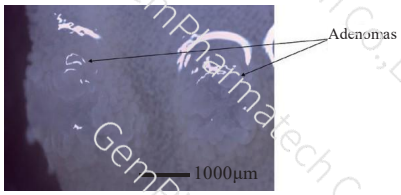
1) Mouse Age：1W

2) Genotype：KI/wt，heterozygote

3) Genetic Locus：*Apc*

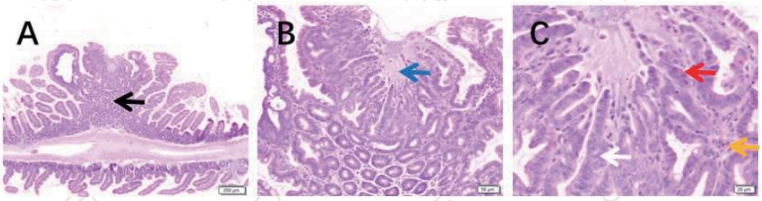
Data support

1. Histological detection of Jejunum



Histological observation of jejunum in Apc-Min mice. Apc-Min mice were raised to 15 weeks with a high-fat diet, and their intestines were dissected. It was found by visual inspection that more adenomas were found in the small intestine of Apc-Min male and female mice, which were more common in the ileum and jejunum.

2. Pathological detection of jejunum



Section of an adenoma of the jejunum from Apc-Min mouse. 3 weeks Apc-Min mice were randomly selected(n=15), and raised to 15 weeks with a high-fat diet.The intestinal tract of the mice was dissected, and the histopathology of the small intestine was observed by fixation, sectioning and HE staining. The results showed that under the high-fat diet, more adenomas were found in the small intestine of Apc-Min mice, and more common in the jejunum and ileum. (Left bar=200μm; Middle bar=50μm ;Right bar=20μm).

Black arrow refers to a large number of proliferative glands in mucosa;Blue arrow refers to necrotic mucosal epithelium;Red arrow refers to paneth cells;Yellow arrow refers to lamina propria inflammatory cells;White arrow refers to atypical hyperplasia glandular epithelium

Breeding and Conservation

1) Ordinary feed（6% fat content）

2) Reproductive Performance：normal

3) Foster Nursing Ability：normal

Physiological and biochemical level

1. Blood Routine Assay

Parameter	Units	Males	Females
Hematology			
Age	weeks	16	16
WBC	K/uL	8.25±7.04	10.23±7.50
RBC	M/uL	4.93±2.17	4.34±1.74
HB	g/L	85.13±32.15	69.04±23.36
HCT	%	28.10±9.45	26.68±7.21
MCV	fL	61.32±12.68	64.80±11.56
MCH	Pg	17.98±2.73	16.36±2.39
MCHC	g/L	296.74±25.39	255.17±28.54
RDW	%	22.98±3.15	23.87±2.80
PLT	K/uL	1146.26±174.77	1166.26±215.68
MPV	fL	5.08±0.40	5.11±0.28
NE#	K/uL	1.74±2.61	1.70±2.37
NE%	%	15.88±10.76	14.63±6.57
LY#	K/uL	5.90±4.35	7.86±5.06
LY%	%	76.45±11.37	79.33±6.60
EO#	K/uL	0.04±0.08	0.09±0.31
EO%	%	0.54±1.42	0.48±1.28
MO#	K/uL	0.57±0.55	0.57±0.44
MO%	%	6.99±3.08	5.49±1.83
BA#	K/uL	0.01±0.03	0.01±0.02
BA%	%	0.15±0.44	0.07±0.20

2. Blood Biochemistry Assay

Parameter	Units	Male	Female
Biochemistry			
Age	weeks	16	16
ALT	IU/L	20.00±9.95	25.13±10.92
AST	IU/L	55.7±26.53	96.26±69.99
TP	g/dL	37.27±5.16	39.42±5.24
ALB	g/dL	19.73±4.63	25.91±5.01
AKP	IU/L	30.10±11.97	73.70±27.23
TBIL	umol/L	0.17±0.19	0.22±0.17
BUN	mmol/L	10.37±2.51	9.19±1.74
CREA	umol/L	15.41±1.63	15.76±3.51
CHOl	mmol/L	3.85±0.85	2.60±0.49
TG	mmol/L	20.09±5.68	1.86±2.85
HDL-C	mmol/L	0.88±0.30	1.08±0.21
LDL-C	mmol/L	0.52±0.21	0.73±0.22
Ca	mmol/L	2.30±0.18	2.38±0.10
P	mmol/L	3.28±1.15	3.71±0.76
Fe	umol/L	24.54±12.66	21.32±10.71
GLU	mmol/L	8.51±1.80	9.70±2.82

Announcement

During the feeding process, pay attention to observe whether there is blood in the stool, and strengthen the observation of male breeding mice in breeding cages. Once the male breeding mice become ill, they will easily die and their production performance will drop sharply.

Publications

1. Z Wang, F Wang, J Zhong. et al. Using apelin-based synthetic Notch receptors to detect angiogenesis and treat solid tumors. Nat Commun. 2020, 11(1): 2163. DOI: 10. 1038/s41467-020-15729-4. 【APCmin/+. T001457】

2. Q Zhao, Y Bi, J Guo. et al. Effect of pristimerin on apoptosis through activation of ROS/endoplasmic reticulum (ER) stress-mediated noxa in colorectal cancer. Phytomedicine . 2021 ; 80:153399. DOI: 10. 1016/j. phymed. 2020. 153399. 【APCmin/+. T001457】

3. XM Wang, C Yang, Y Zhao. et al. The deubiquitinase USP25 supports colonic inflammation and bacterial

infection and promotes colorectal cancer. Nature Cancer. 2020, Jul 06. doi. org/10. 1038/s43018-020-0089-4.【Villin-Cre. T000142. $Apc^{Min/+}$. T001457】

4．XM Wang, C Yang, Y Zhao. et al. The deubiquitinase USP25 supports colonic inflammation and bacterial infection and promotes colorectal cancer. Nature Cancer. 2020, Jul 06. doi. org/10. 1038/s43018-020-0089-4.【Villin-Cre . T000142. $Apc^{Min/+}$. T001457】

References

1. Markowitz SD, Bertagnolli MM.“Molecular origins of cancer: Molecular basis of colorectal cancer”.New England Journal of Medicine361(25) (2009):2449–60.2.
2. Valvezan AJ, Zhang F, Diehl JA, Klein PS. "Adenomatous Polyposis Coli (APC) Regulates Multiple Signaling Pathways by Enhancing Glycogen Synthase Kinase-3 (GSK-3) Activity". J Biol Chem. 287 (2012);:3823-3832.
3. Cleary SP, Kim H, Croitoru ME, Redston M, Knight JA, Gallinger S, Gryfe R. "Missense polymorphisms in the adenomatous polyposis coli gene and colorectal cancer risk". Dis Colon Rectum.51 (2008):1467-1473; discussion 1467-1473.
4. Leber, M. F., Efferth, T."Molecular principles of cancer invasion and metastasis (Review)". International Journal of Oncology 34, no. 4 (2009): 881-895.