Also Known As: Murphy Roths Large, MRL

The MRL/MpJ mice are the parent and control strain for MRL/MpJ-\textit{Fas}^{lpr} (Stock Nos. 000485, 006825). Despite carrying the normal \textit{Fas} gene, MRL/MpJ mice also exhibit autoimmune disorders, but symptoms are manifested much later in life compared to those the MRL/MpJ-\textit{Fas}^{lpr} mice. As a strain developed as the control for MRL/MpJ-\textit{Fas}^{lpr}, MRL/MpJ mice are useful in the study of their comparable defects and diseases, including systemic lupus erythematosus and Sjögren syndrome.
RESEARCH APPLICATIONS

Internal/Organ Research
Immunology, Inflammation and Autoimmunity Research
Neurobiology Research
Sensorineural Research

BASE PRICE
Starting at:
$100.93 Domestic price for female 3-week

The MRL/MpJ mice are large but docile to the point that males rarely fight. They are the parent and control strain for for MRL/MpJ-Fas\textsuperscript{lor} (Stock Nos. 000485, 006825). Despite carrying the normal Fas gene, MRL/MpJ mice also exhibit autoimmune disorders, but symptoms are manifested much later in life compared to those the MRL/MpJ-Fas\textsuperscript{lor} mice. Starting about three months of age, levels of circulating immune complexes rise greatly in the MRL-Fas\textsuperscript{lor} mouse but not in the wildtype control, MRL/MpJ. Also beginning at 3 months Fas\textsuperscript{lor} mice exhibit very severe proliferative glomerulonephritis, whereas in the MRL/MpJ controls usually only mild glomerular lesions are detected. MRL/MpJ inbred female typically die at 73 weeks of age and males die at 93 weeks. This compares to a lifespan of 17 weeks in the female and 22 weeks for males in the mouse homozygous for Fas\textsuperscript{lor}. See MRL/MpJ-Fas\textsuperscript{lor} (Stock No. 000485) for additional information. As a strain developed as the control for MRL/MpJ-Fas\textsuperscript{lor}, MRL/MpJ mice are useful in the study of their comparable defects and diseases.

MRL/MpJ, and one of its ancestral strains LG/J, display heightened wound healing relative to a panel of other inbred strains. At 4 weeks post-injury, 2mm ear punch wounds heal to 0-0.4mm in MRL/MpJ mice but are still 1.2-1.6mm in C57BL/6 mice. At 15 days post-injury C57BL/6 show a maximal closure of 30% reduction in ear hole size while MRL show 85% reduction. The process of healing in MRL/MpJ mice is faster, more complete, showed increased swelling, angiogenesis, fibroblast migration, extracellular matrix deposition, and decreased scarring and fibrosis. Additionally, hair follicles and accompanying sebaceous glands regenerate to a much greater degree. The other ancestral strains of MRL/MpJ (C3H, C57BL/6, and AKR) do not display this enhanced healing. Bone marrow transplantation shows that the MRL/MpJ healing phenotype does not readily transfer with bone marrow and remains in the irradiated host tissues. Enhanced healing of cardiac wounds has also been reported in MRL/MpJ mice. In this model, a very high mitotic index (10-20%) is found, similar to that seen in non-mammalian tissue regeneration. Using F2 and backcross mapping of MRL/MpJ-Fas\textsuperscript{lor} x B6 progeny McBrearty et al. identified multiple wound healing QTLs, Heal2 and Heal3, on MRL/MpJ chromosome 13 in the region of D13Mit115 and D13Mit129 respectively, Heal5 on MRL/MpJ chromosome 12 in the region of D12Mit233; Heal1 on chromosome 8 of C57BL/6 in the region of D8Mit211; and a highly suggestive locus on MRL/MpJ chromosome 7 in the region of D7Mit220. In crosses between MRL/MpJ x SJL/J, Masinde et al. identified 10 QTL for wound healing, confirming and extending the findings of McBrearty et al. Chromosomes 1, 3, 6, and 13 each have a single QTL with that on chromosome 13 being statistically suggestive but not significant, while chromosomes 4, 7, and 9 each have two statistically significant QTLs. (Clark
et al., 1998; Leferovich et al., 2001; Kench et al., 1999; McBrearty et al., 1998; Masinde et al., 2001.)

Microarray analysis and SELDI ProteinChip analysis identified multiple genes and proteins that have varied expression in the ear punch wounds of MRL/MpJ-Fas<sup>Fas</sup> versus C57BL/6. The changes in expression patterns suggest that in MRL/MpJ mice there is less of an inflammatory response and an earlier transition into tissue repair than is seen in C57BL/6. (Li et al., 2000 and 2001.)

Blankenhorn et al. found that MRL/MpJ females heal faster and more completely than males. Some Heal QTLs are sexually dimorphic with Heal<sub>2</sub>, 3, 7, 8, 10, and 11 having greater effects in males and Heal<sub>4</sub>, 5, and 9 having greater effects in females. Castration improves wound healing in MRL/MpJ males to nearly the degree seen in females, but ovariectomy does not improve the degree of healing seen in MRL/MpJ females. (Blankenhorn et al., 2003)

Relative to B10.D2nSnJ mice, MRL/MpJ mice have decreased Neutrophil accumulation in the bronchiolar lavage in response to LPS infusion, and tests using bone marrow chimeras reveal that the pulmonary inflammatory response transfers with bone marrow. Transforming growth factor beta 1 autologous induction is reduced in MRL/MpJ splenocytes while macrophages show a reduction in the transforming growth factor beta 1 induction of interleukin 1 beta and tumor necrosis factor alpha production but no significant reduction in transforming growth factor beta 1 production. (Kench et al., 1999.)
Genotyping Protocols
Genotyping resources and troubleshooting
Inbred mouse strains are maintained through sibling (sister x brother) matings; no genotyping required.

Dietary Information
LabDiet® 5K52 formulation (6% fat)

Breeding Considerations
This strain is a good breeder.

Due to the heightened healing which occurs in mice with the MRL genetic background, ear punch is not a good method for individual mouse identification in this strain.

Additional Breeding and Husbandry Support
Mating System
Sibling x Sibling

Appearance
albino, unaffected

Related Genotype: $a/a$ $Tyr^c/Tyr^c$ $Fas^+/Fas^+$

Citation
When using the MRL mouse strain in a publication, please include JAX stock #000486 in your Materials and Methods section.

Animal Health Reports
Facility Barrier Level Descriptions

- AX28 (Maximum)
- RB08 (Maximum)

Pricing & Availability

Sized to accommodate orders of up to 50 or more. Ask Customer Service for details.

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**Related Products and Services**

| Mouse ES Cells | MRL/MpJ mES cells | $1095.00 |

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General Terms and Conditions

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Email: TechTran@jax.org

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