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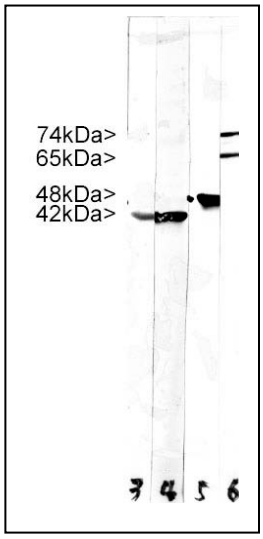
Catalogue# MCA-4C4: Mouse Monoclonal Antibody to Lamin A/C: LMNA

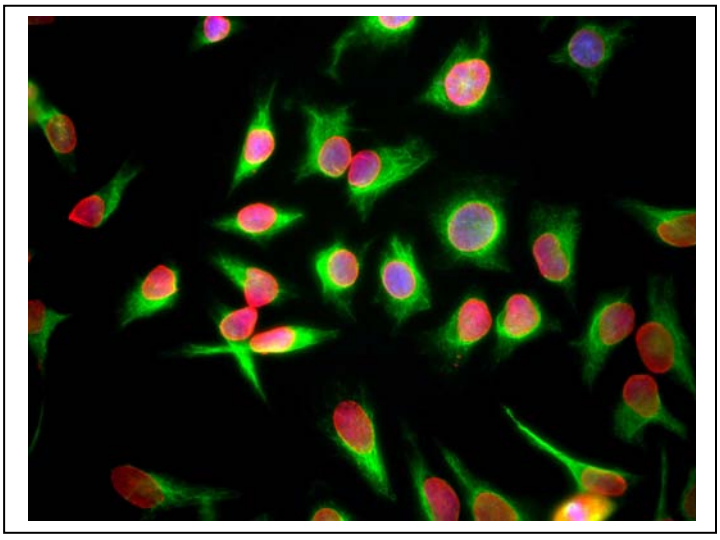
The Immunogen: The Lamin proteins are members of the intermediate filament protein family but are located inside the nucleus rather than in the cytoplasm (1). The lamins function as skeletal components tightly associated with the inner nuclear membrane.

Originally the proteins of the nuclear cytoskeleton were named Lamin A, B and C, from top to bottom as visualized on SDS-PAGE gels. Subsequently, it was found that Lamins A and C were coded for by a single gene (2), while the Lamin B band may contain two proteins encoded by two genes now called Lamin B1 and Lamin B2. Lamin A has a mass of about 74 kDa while Lamin C is 65 kDa. The Lamin A protein includes a C-terminal segment of 98 amino acids missing from Lamin C, while Lamin C has a unique C-terminal 6 amino acid peptide not present in Lamin A. Apart from these regions Lamin A and C are identical so that antibodies raised against either protein are likely to cross react with the other.

This is the case with this polyclonal, which was raised against full length recombinant human Lamin A. Lamin polymerization and depolymerization is regulated by phosphorylation by cyclin dependent protein kinase 1 (CDK1), the key component of "maturation promoting factor", the central regulator of cell division. Activity of this kinase increases during cell division and is responsible for the breakdown of the nuclear lamina.

Mutations in the LMNA gene are associated with several serious human diseases, including Emery-Dreifuss muscular dystrophy, familial partial lipodystrophy, limb girdle muscular dystrophy, dilated cardiomyopathy, Charcot-Marie-Tooth disease type 2B1, and Hutchinson-Gilford progeria syndrome. This family of diseases belong to a larger group which are often referred to as Laminopathies, though some laminopathies are associated in defects in Lamin B1, B2 or one or other of the numerous nuclear lamina binding proteins. A truncated version of lamin A, commonly known as progerin, causes Hutchinson-Gilford progeria syndrome, a form of premature aging (3). The HGNC name for this protein is LMNA.





Left: Strip blots of crude HeLa cell extract stained with MCS-4C4. Note two strong clean bands at 74 kDa and 64 kDa, corresponding to Lamin A and C, in the lane labeled 6. Lane 5 was stained with our antibody to Enolase 1, which we will market shortly. Lanes 3 and 4 were reacted with MCA-5J11, our monoclonal antibody to all six actin isotypes. Molecular weights of each protein are as indicated. **Right:** HeLa cells staining with MCA-4C4 (red), and counterstained with EnCor's chicken polyclonal antibody to Vimentin CPCA-Vim (green) and DNA (blue). The MCA-4C4 antibody reveals strong nuclear lamina staining, while the Vimentin antibody reveals cytoplasmic intermediate filaments.

Antibody characteristics: MCA-4C4 was raised against full length recombinant human Lamin C, and reacts with both Lamin A and C. MCA-4C4 is a mouse IgG1 class antibody, and is known to react with lamin A/C from human, cow, pig, mouse, rat and other mammals. Since Lamin A/C is highly conserved in protein sequence, it is likely that the antibody is effective on other species also.

Suggestions for use: The antibody solution is affinity purified from tissue culture supernatant and is at concentration of 1mg/mL in phosphate buffered saline. The antibody solution can be used at dilutions of at least 1:1,000 in immunofluorescence experiments. In western blotting using chemiluminescence it can be used at dilutions of 1:10,000 or lower. Antibody preparation contains 10mM sodium azide preservative (Link to http://www.encorbio.com/MSDS/azide.htm for Material Safety Data Sheet). Avoid repeated freezing and thawing, store at 4°C or -20°C.

Limitations: This product is for research use only and is not approved for use in humans or in clinical diagnosis.

References:

1. Fisher, D. Z., Chaudhary, N., Blobel, G. cDNA sequencing of nuclear lamins A and C reveals primary and secondary structural homology to intermediate filament proteins. Proc. Nat. Acad. Sci. 83: 6450-6454 (1986).

2. McKeon, F. D., Kirschner, M. W., Caput, D. Homologies in both primary and secondary structure between nuclear envelope and intermediate filament proteins. Nature 319: 463-468 (1986).

3. Liu, B. and Zhou, Z. Lamin A/C, laminopathies and premature ageing. Histol. Histopathol. 23: 747-763 (2006).

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