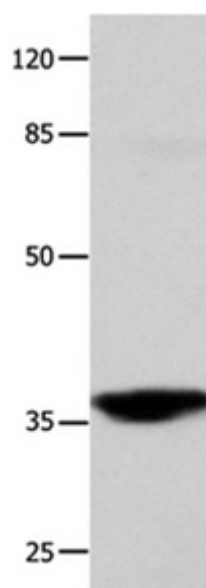
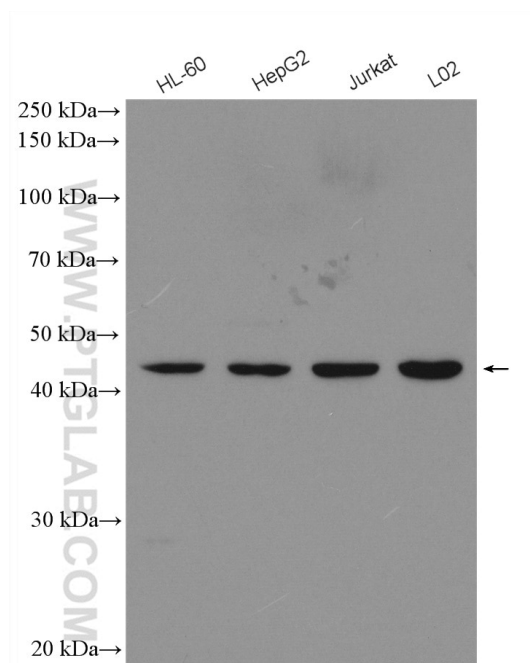


**Supplementary Material 1.** Validation data for BUD31 antibody (LifeSpan Biosciences, Cat# LS-C30571), including Western blot results. Images were obtained from the manufacturer's website (<https://www.lsbio.com/antibodies/bud31-antibody-aa71-120-wb-western-ls-c30571/29040#validation-section>).



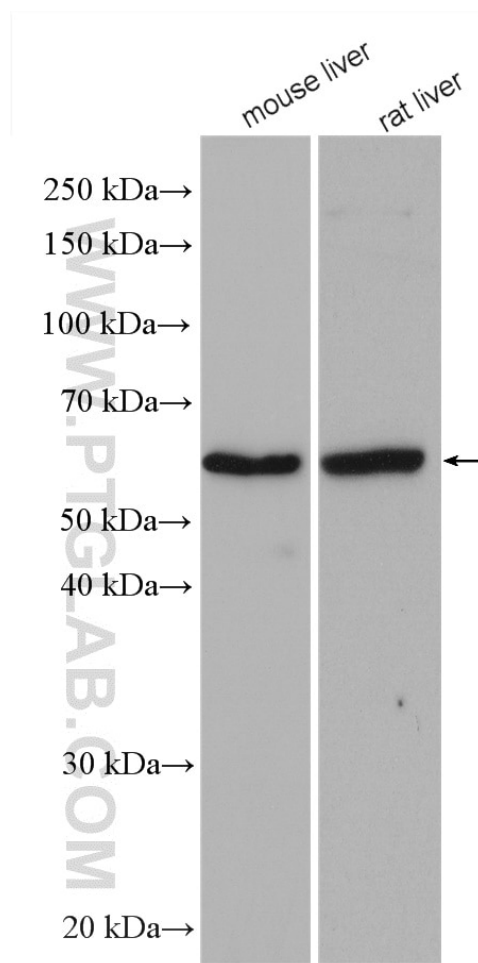
**Supplementary Material 2.** Validation data for CTSG antibody (Abcam, Cat# ab197354), including Western blot and IHC results. Images were obtained from the manufacturer's website (<https://www.abcam.com/en-us/products/primary-antibodies/cathepsin-g-antibody-ab197354>).



**Supplementary Material 3.** Validation data for TRIM14 antibody (Proteintech, Cat# 15742-1-AP), including Western blot and IHC results. Images were obtained from the manufacturer's website (<https://www.ptglab.com/products/TRIM14-Antibody-15742-1-AP.htm>).



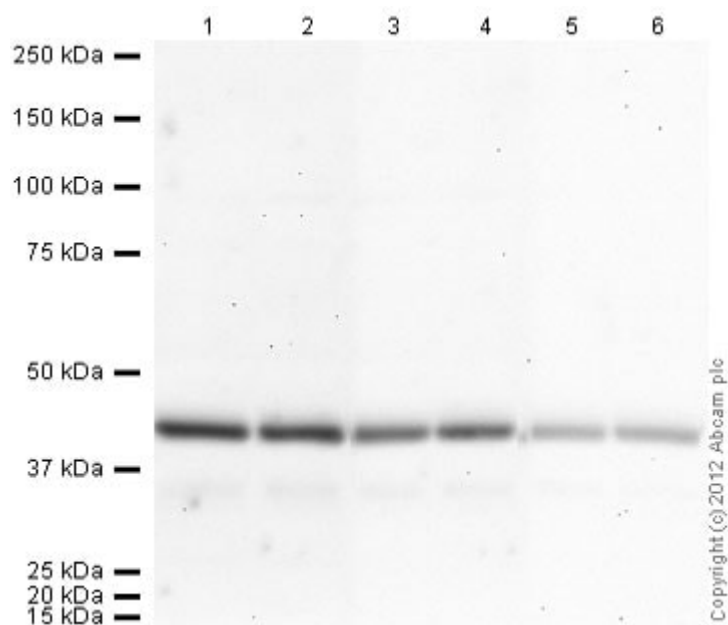
**Supplementary Material 4.** Validation data for ALDH1A1 antibody (Origene, Cat# TA302641), including Western blot results. Images were obtained from the manufacturer's website (<https://www.nordicbiosite.com/product/TA302641/ALDH1A1>).



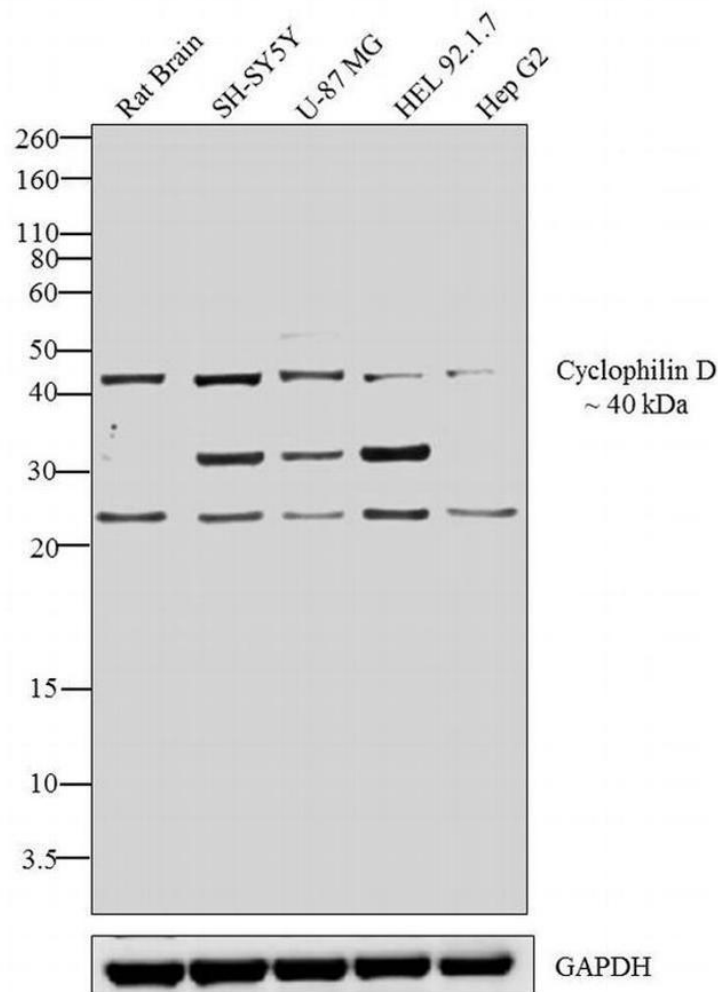
**Supplementary Material 5.** Validation data for BCO2 antibody (Proteintech, Cat# 14324-1-AP), including Western blot results. Images were obtained from the manufacturer's website (<https://www.ptglab.com/products/BCO2-Antibody-14324-1-AP.htm>).



**Supplementary Material 6.** Validation data for PSMB8 antibody (Origene, Cat# TA305716), including Western blot results. Images were obtained from the manufacturer's website (<https://www.origene.com/catalog/antibodies/primary-antibodies/ta305716-psmb8-goat-polyclonal-antibody>).



**Supplementary Material 7.** Validation data for HRP-conjugated secondary antibody (Abcam, Cat# ab97110), based on manufacturer's product information. Images were obtained from the manufacturer's website (<https://www.abcam.co.jp/products/secondary-antibodies/donkey-goat-igg-hl-hrp-ab97110.html>).



**Supplementary Material 8.** Validation data for HRP-conjugated secondary antibody (Thermo Fisher Scientific, Cat# G21234), based on manufacturer's product information. Images were obtained from the manufacturer's website (<https://www.thermofisher.com/antibody/product/Goat-anti-Rabbit-IgG-H-L-Cross-Adsorbed-Secondary-Antibody-Polyclonal/G-21234>).