How do the sequences specific genes (drug target, enzyme substrates, cytochromes, transporters…) compare between humans, dogs, cats and rodents ?

Several studies have shown significant homologies between dogs and humans for recognized cancer-associated genes including MET, mTOR, BRCA, MDM2, Rb, p16 and p53. Cytogenetic abnormalities that define human tumors, including BCR-Abl translocations in chronic myelogenous leukemia and c-KIT mutations in gastrointestinal stromal tumors (GIST), have been found in comparable canine malignancies.

Recently, Rowell et al. described a phylogenetic tree of the mammalian c-Met receptor, dog breed-specific germline variation with potential cancer relevance, somatic genome alterations in canine cancer and examples of onco-suppressor genes profiles.

The table below displays a list of cancer related genes and their percentage of protein homologies between the species.

	Mouse (%)	Cat (%)	Dog (%)
p53	77	80	79
c-Myc	91	93	94
COX-2	87	90	90
c-Kit/CD117	82	89	88
K-RAS	97	99	99
EGFR	88	89	89
PDGFR-α	94	91	98
β-catenin	99	99	99
PTEN	99	100	100
BRCA1	56	72	74

Notes: The sequences identified in various species were compared using the Basic Local Alignment Search Tool from the National Center for Biotechnology Information.

List of major molecular targets with their sequence percentage identities to human proteins