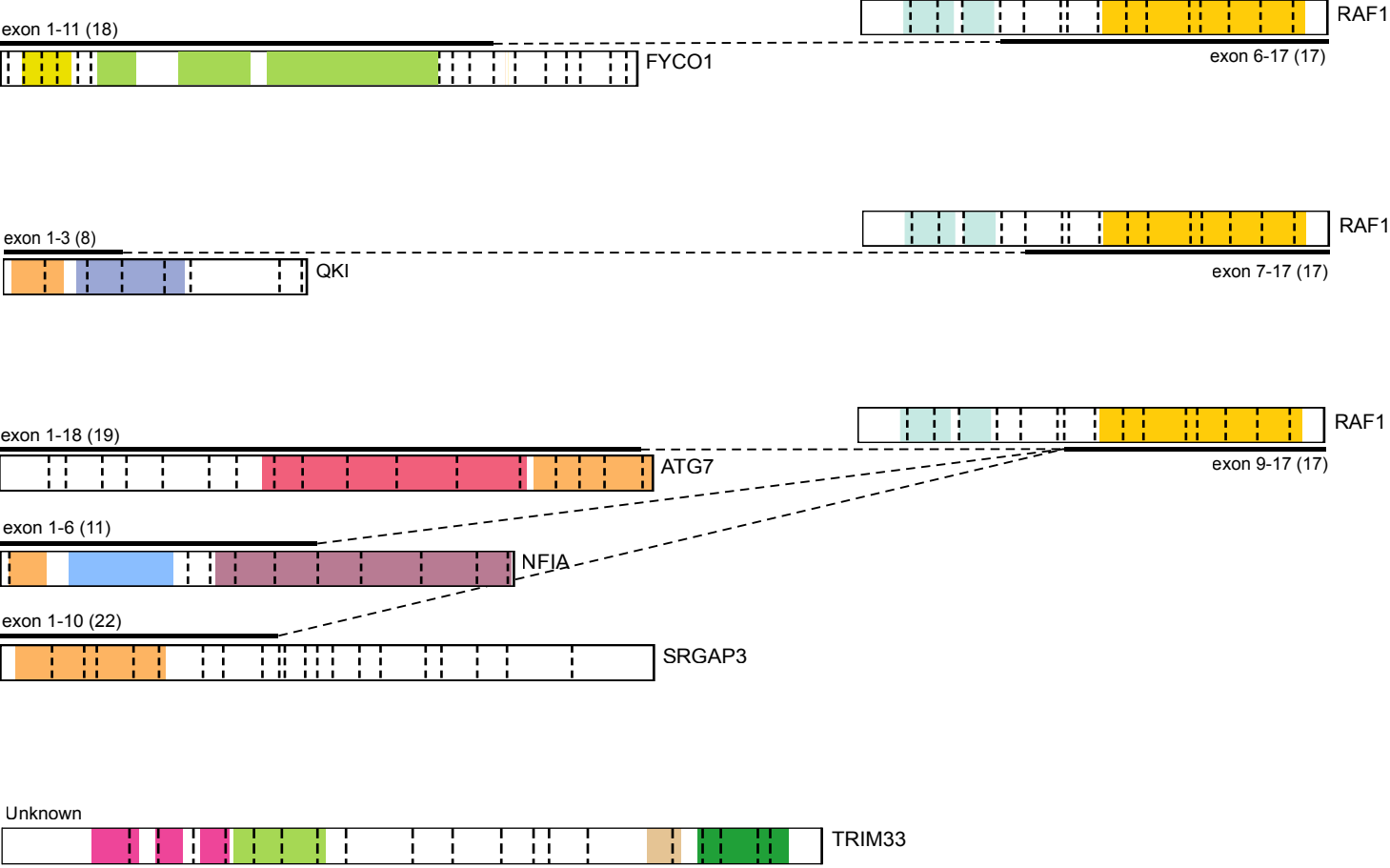


Online resource 2

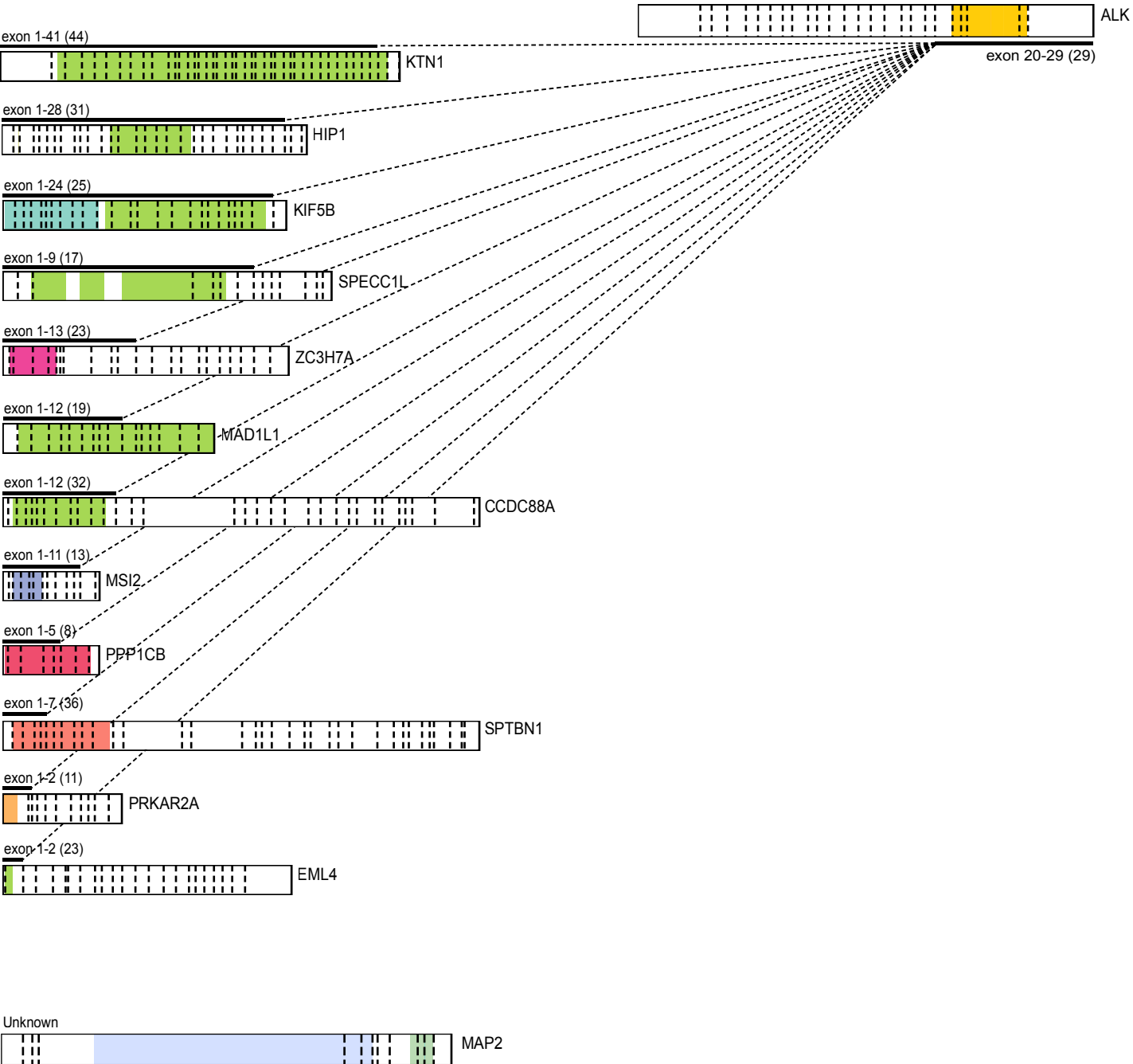


Online resource 3



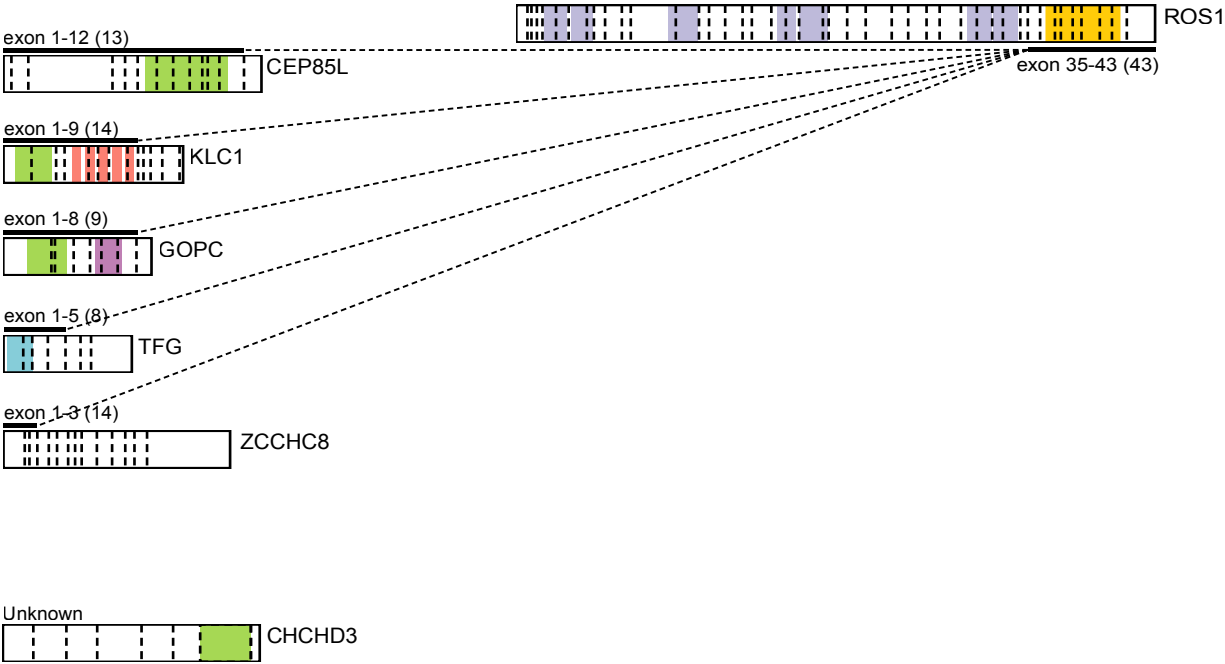
- | | | |
|--------------------|---------------------|-----------------------|
| Tyrosine Kinase | Dimerization domain | NF1 modulation region |
| Ras-binding domain | RNA binding domain | Zinc finger |
| RUN domain | Adenylation domain | PHD finger |
| Coiled coil domain | DNA binding domain | Bromo domain |

Online resource 4



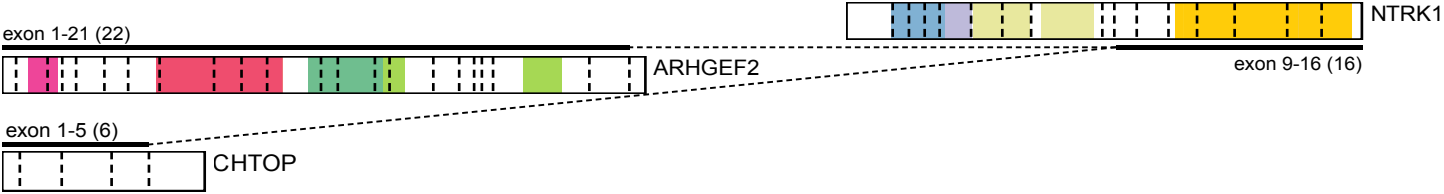
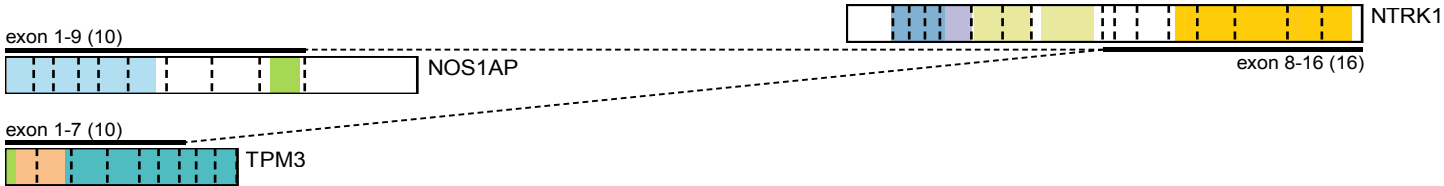
- | | | |
|-----------------|---------------|-----------------|
| Tyrosine Kinase | RNA binding | MAP2 domain |
| Coiled coil | Phosphatase | Tubulin binding |
| Kinesin motor | Actin binding | |
| Zinc finger | Dimerization | |

Online resource 5



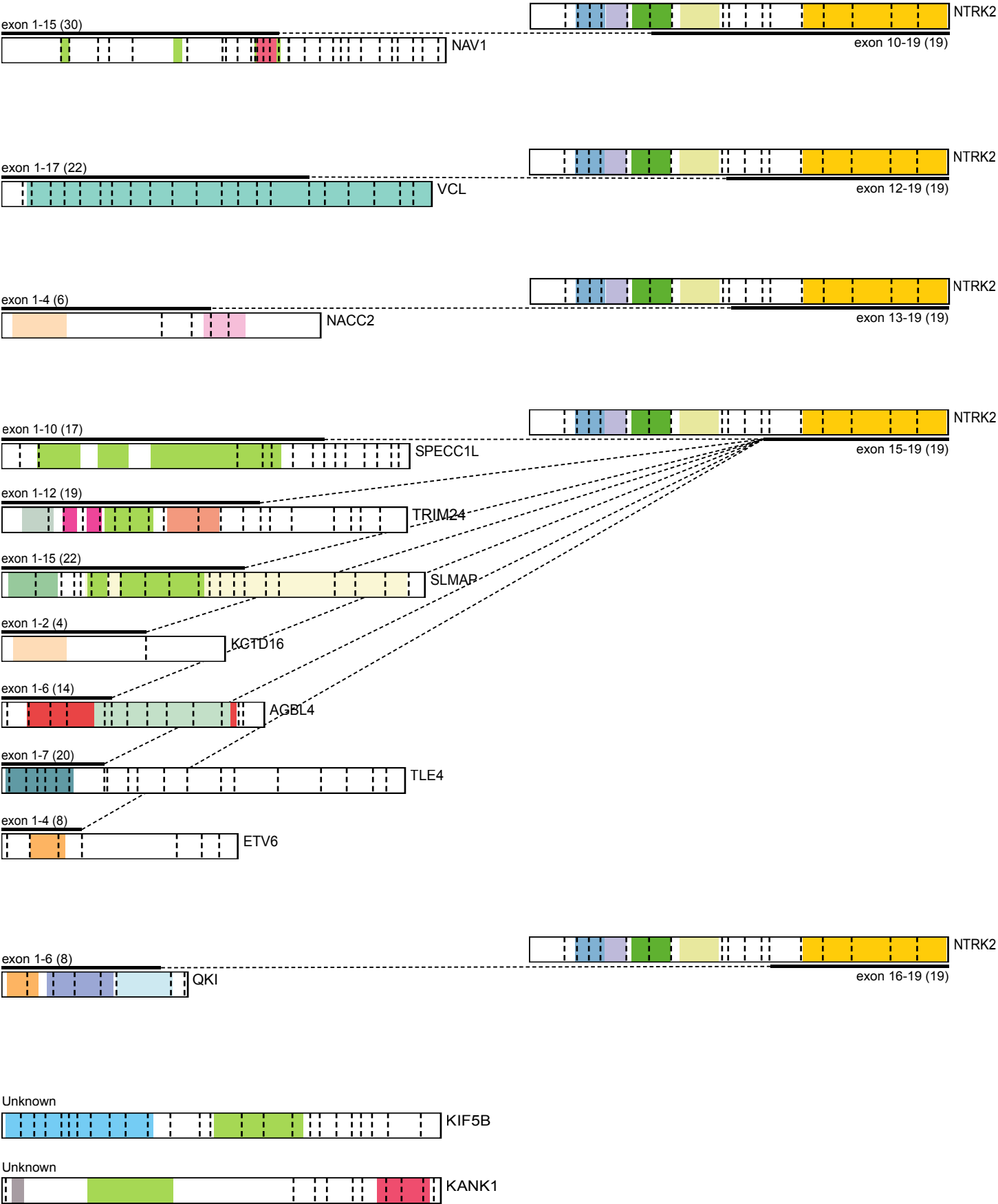
- Tyrosine Kinase
- Fibronectin type 3 domain
- Coiled coil
- TPR repeat
- PDZ
- PB1 domain

Online resource 6a

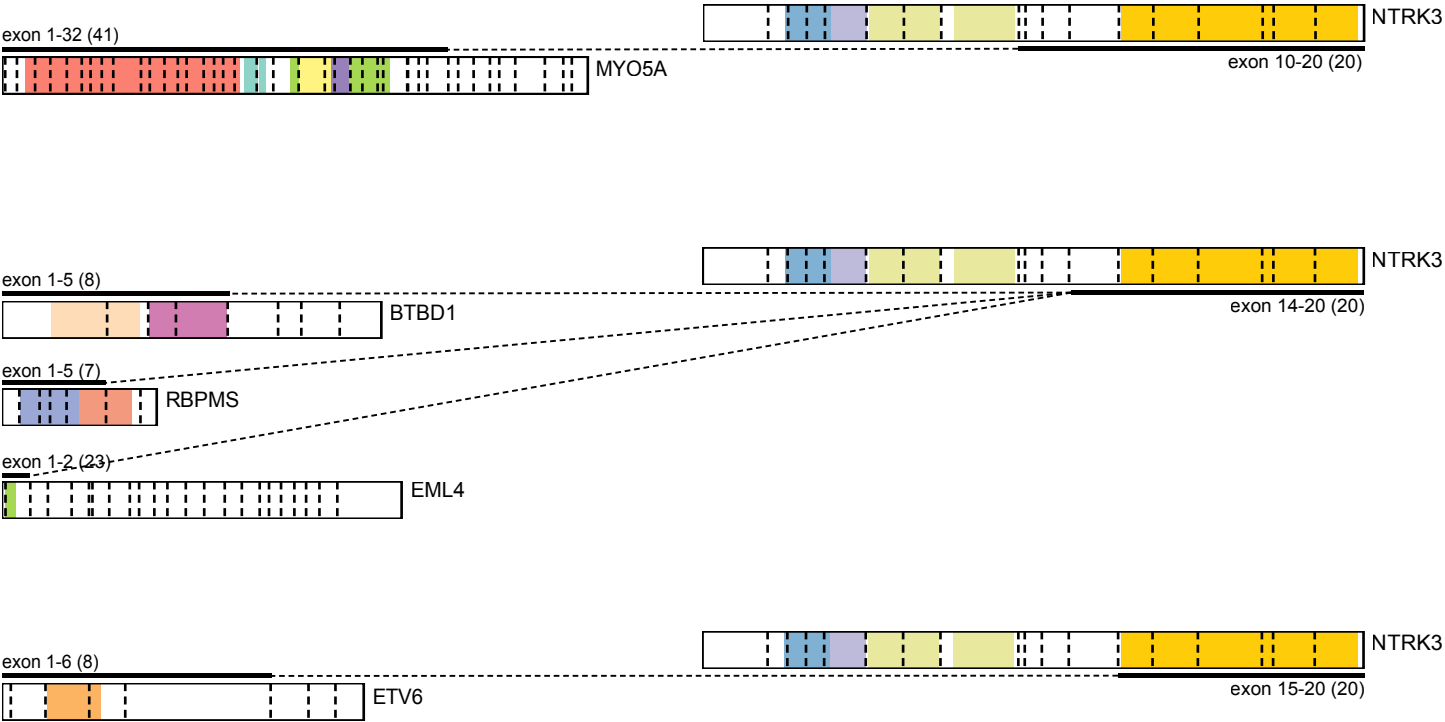


- | | | |
|---------------------|-------------------------|-------------------|
| Tyrosine Kinase | Phosphotyrosine binding | Zinc finger |
| Leucine rich repeat | Coiled coil | RhoGEF domain |
| C2 domain | Leucine Zipper | PH ARHGEF2 domain |
| Trk receptor | Tropomyosin | |

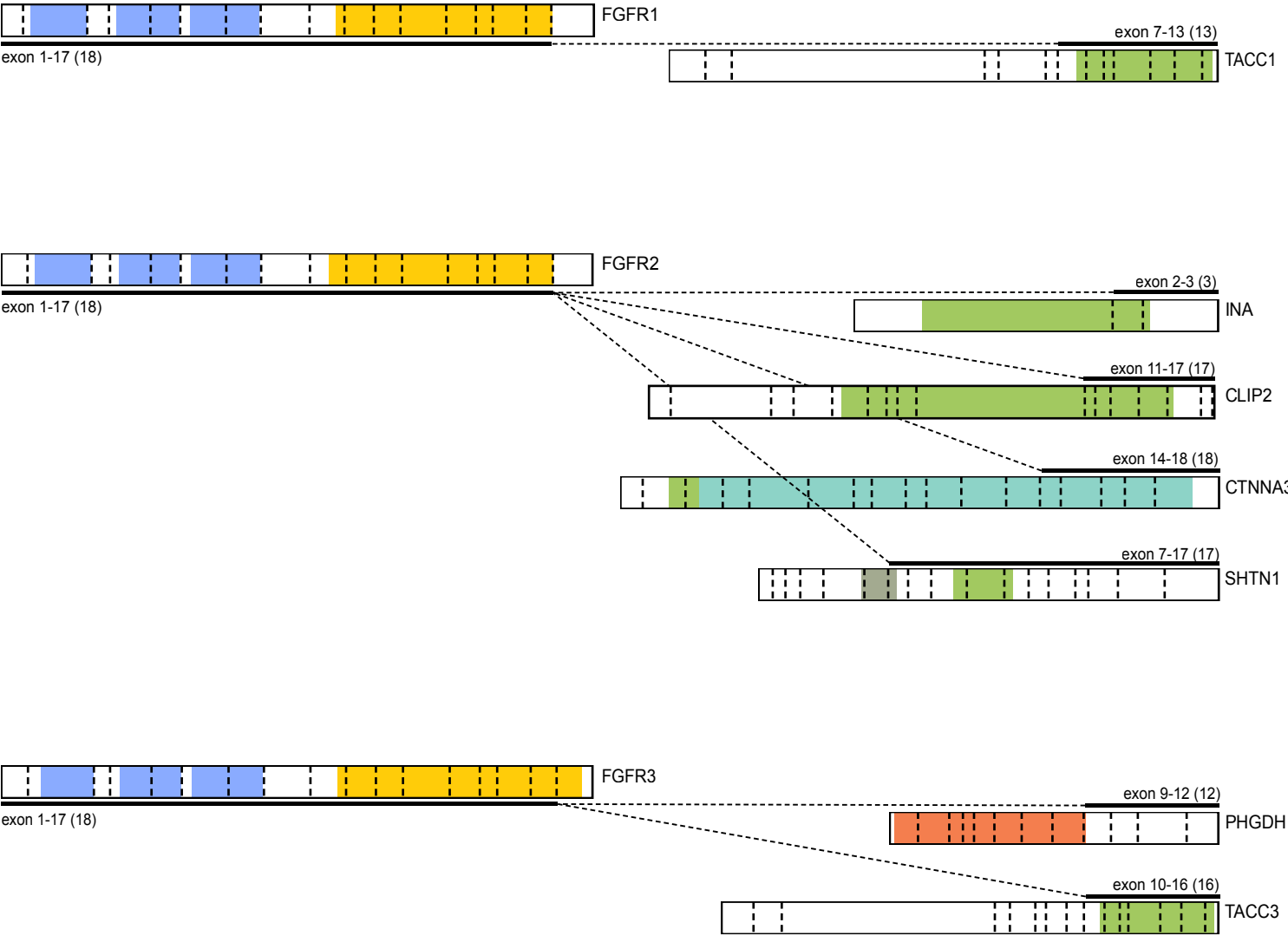
Online resource 6b



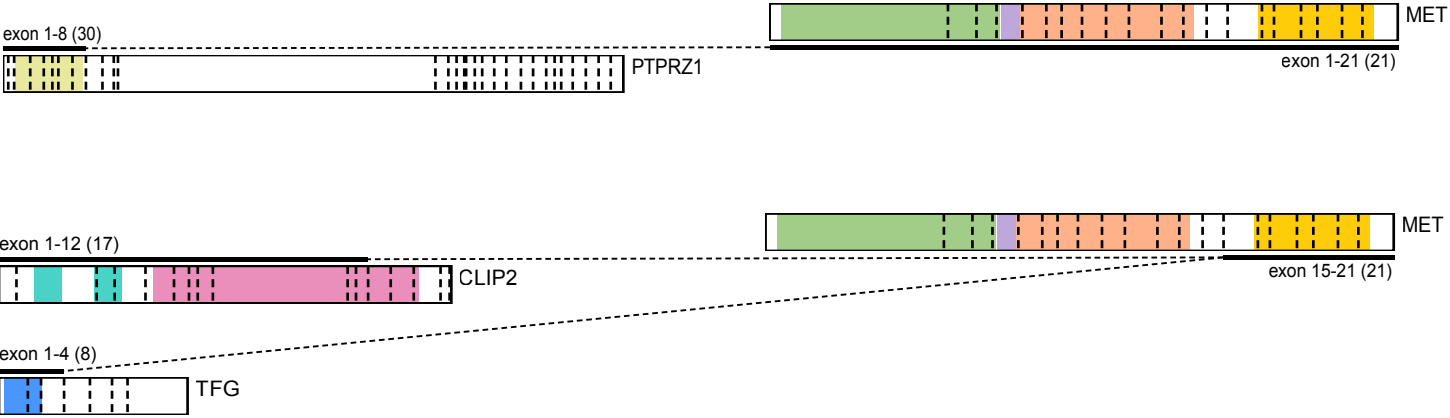
Online resource 6c



Online resource 7

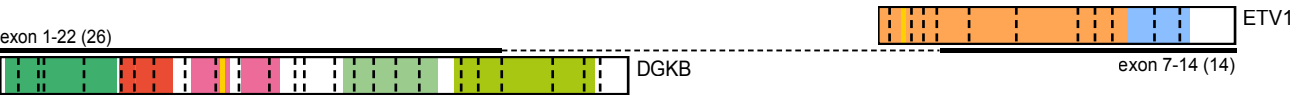


Online resource 8



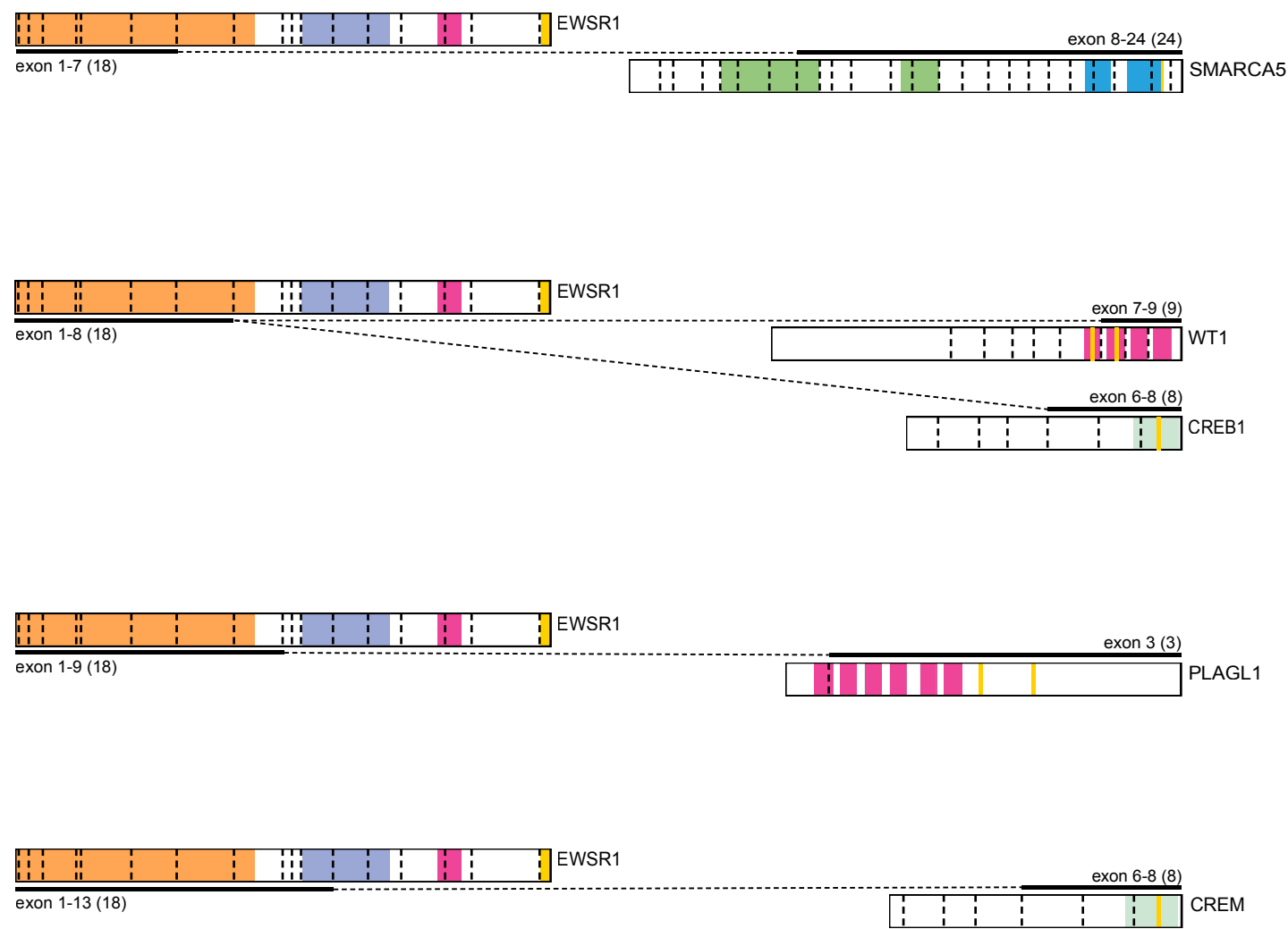
- | | |
|--|--|
|  Tyrosine Kinase |  CARP receptor |
|  Sema domain |  CAP-Gly domain |
|  PSI |  Smc domain |
|  IPT domain |  PB1 domain |

Online resource 9



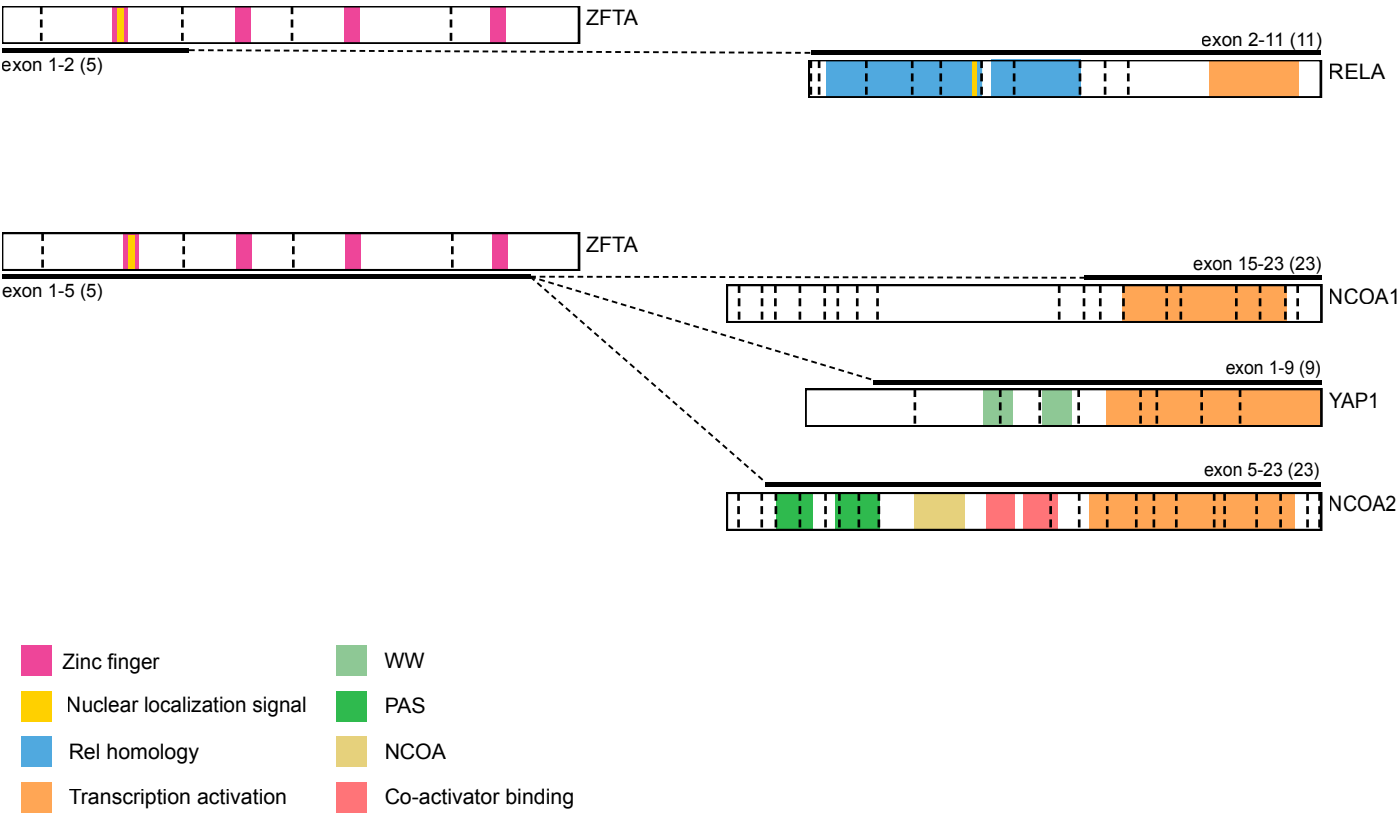
- | | |
|-----------------------------|----------------------|
| Transcription activation | Helix loop helix |
| Nuclear localization signal | Zinc binding |
| DNA binding | DAG kinase catalytic |
| DAG kinase N terminal | DAG kinase accessory |

Online resource 10

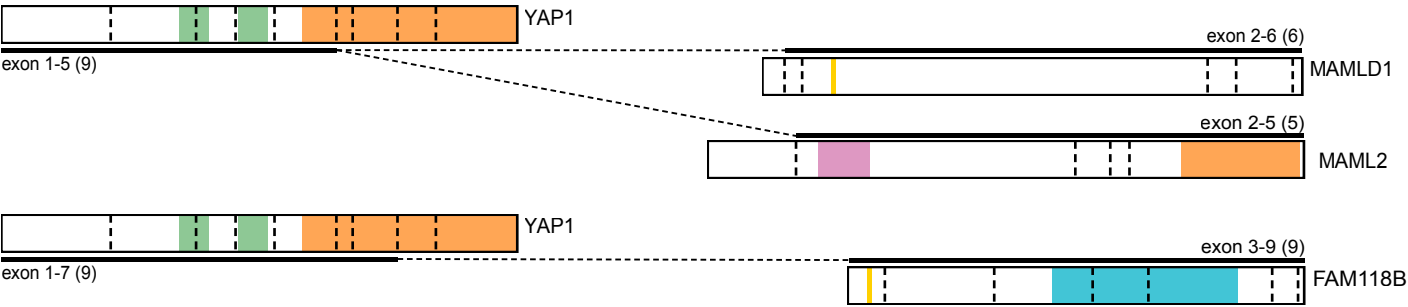


- | | |
|-----------------------------|----------------------|
| Transcription activation | Helicase |
| RNA binding | SANT |
| Zinc finger | Basic leucine zipper |
| Nuclear localization signal | |

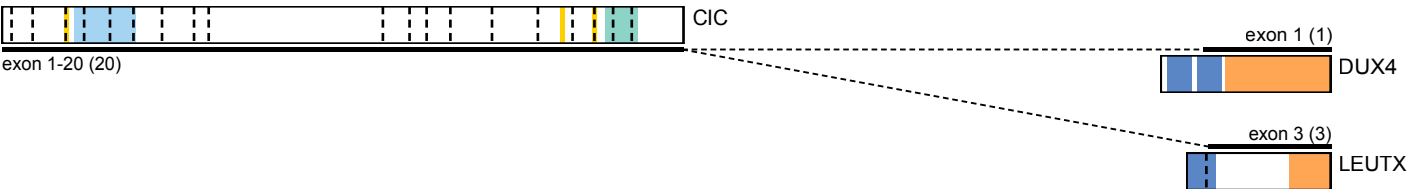
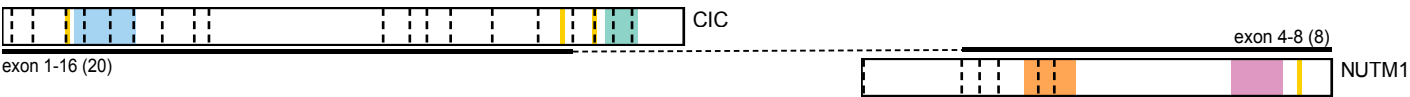
Online resource 11



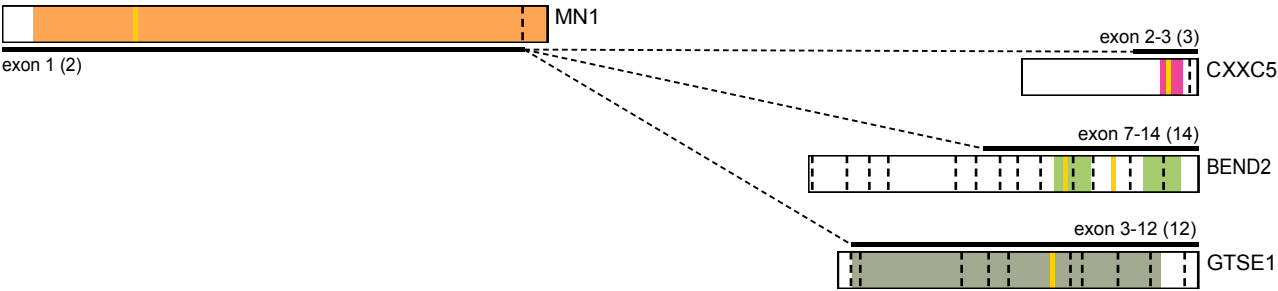
Online resource 12



- WW
- Transcription activation
- Nuclear localization signal
- Sir-z like
- Acidic domain

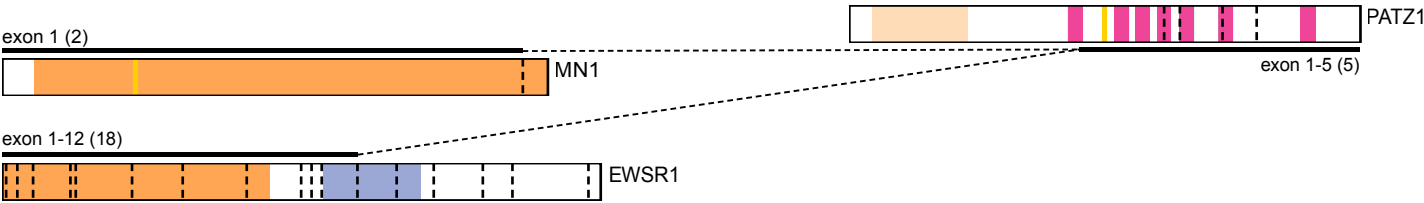


- HMG
- Nuclear localization signal
- C1
- Transcription activation
- Acidic domain
- Homeobox



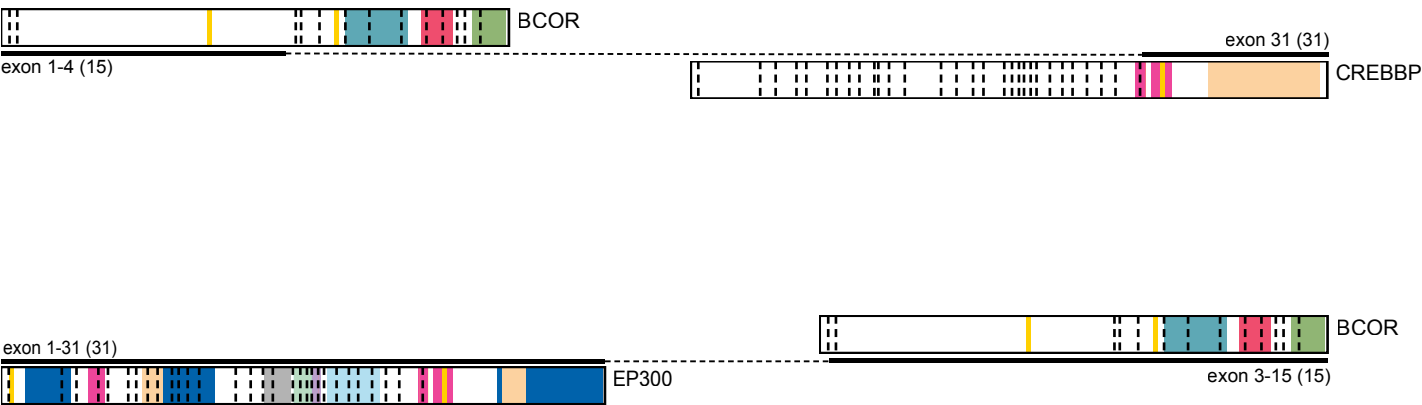
- Transcription activation
- Nuclear localization signal
- Zinc finger
- BEN
- Unknown function

Online resource 15

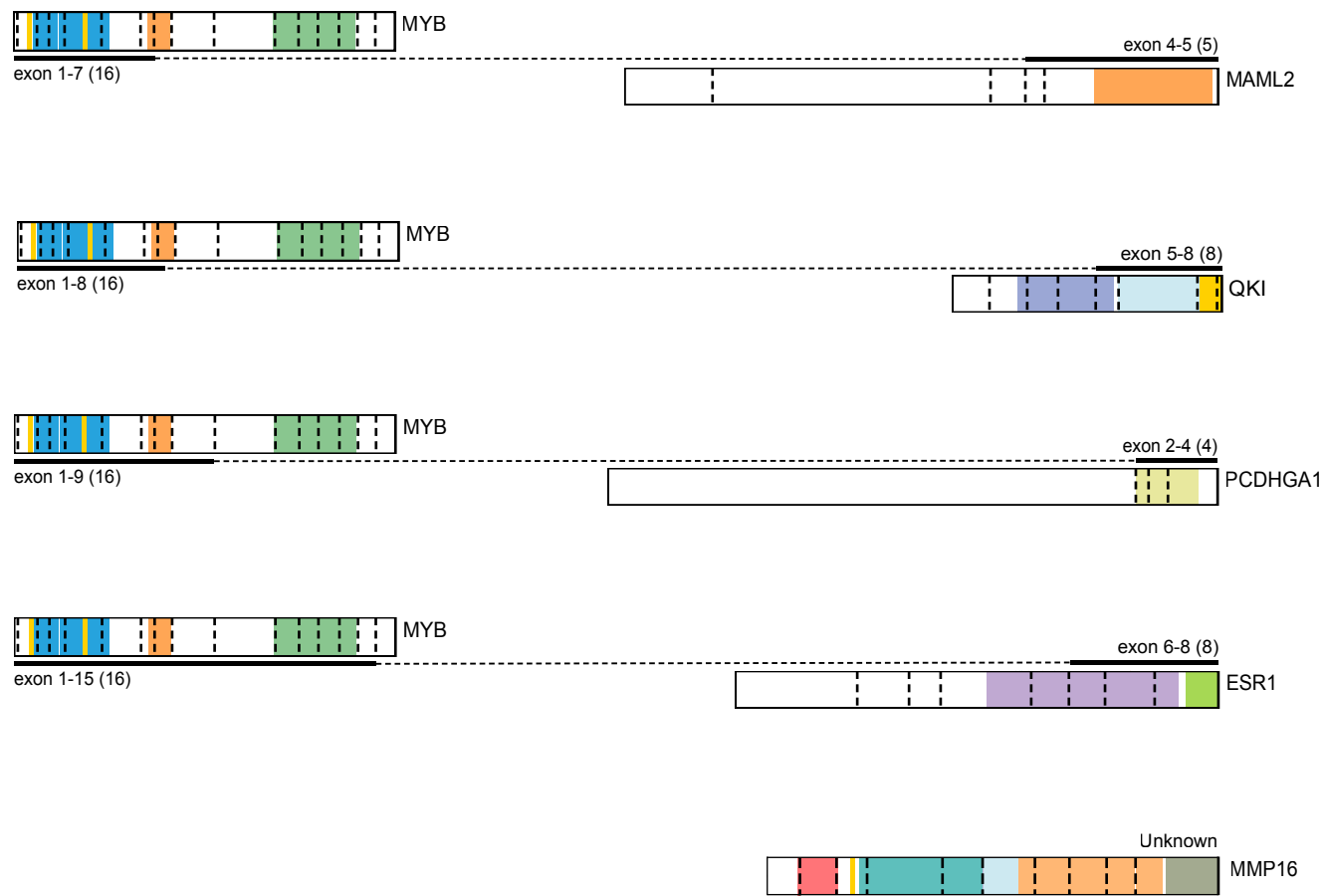


- Homodimerization
- Zinc finger
- Nuclear localization signal
- Transcription activation
- RNA binding

Online resource 16



- | | | |
|-----------------------------|--------------------------|-------------------|
| Nuclear localization signal | Zinc finger | RING |
| BCOR | CREB binding | PHD finger |
| Ank repeat | Mediator-complex binding | Histone acetylase |
| Polycomb group binding | Bromo | |



- | | | | |
|-----------------------------|---------------------------|-----------------------|------------------|
| Sant | RNA binding | Co-activator binding | Unknown function |
| Nuclear localization signal | Large tegument protein | Peptidoglycan binding | |
| Transcription activation | Cytoplasmic cadherin tail | MC | |
| Negative regulation | Ligand binding | HX | |

Online resource legends

Online resource 1 Table with all the fusion genes detected in pediatric CNS neoplasms.

Online resource 2 Fusions with BRAF. TRIM24 has no known breakpoint and is thus not connected. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 3 Fusions with RAF. TRIM 33 has no known breakpoints and is thus not connected. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 4 Fusions with ALK. MAP2 has no known breakpoints and is thus not connected. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 5 Fusions with ROS1. CHCHD3 has no known breakpoint and is thus not connected. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 6 Fusions with NTRK family members. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. **a** Fusions with NTRK1. **b** Fusions with NTRK2, KIF5B and KANK1 have no known breakpoints and are thus not connected. **c** Fusions with NTRK3. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 7 Fusions with FGFR. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 8 Fusions with MET. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 9 Fusions with ETV1. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 10 Fusions with EWSR1. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 11 Fusions with ZFTA. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 12 Fusions with YAP1. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 13 Fusions with CIC. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 14 Fusions with MN1. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 15 Fusions with PATZ1. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 16 Fusions with BCOR. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.

Online resource 17 Fusions with MYB. The exons shown are only the coding exons. For every protein, the exons that are retained in the fusion protein are specified, as well as the total exons (in between brackets) in the original protein. The most prominent breakpoint for each fusion is chosen, other breakpoints might also occur. Figure was generated with and adapted from ProteinPaint <https://pecan.stjude.org/proteinpaint/>.