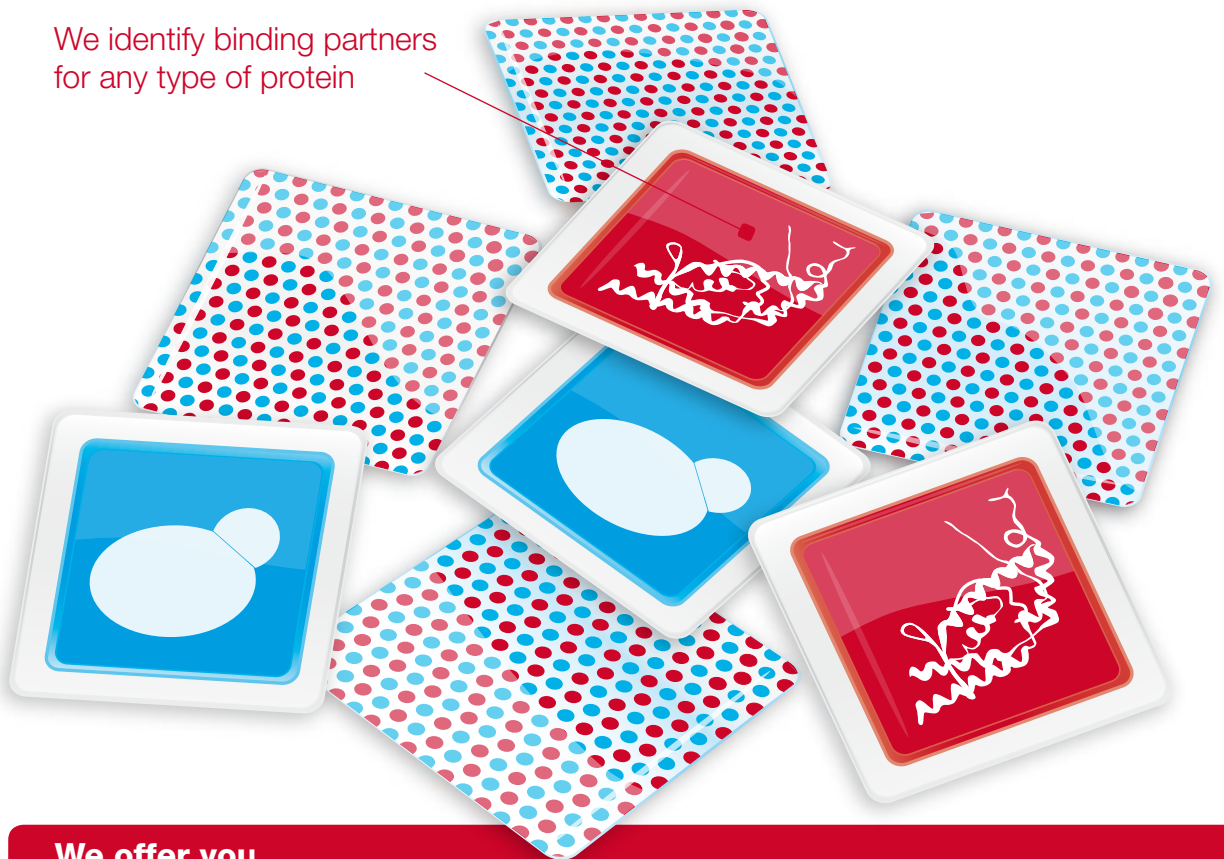


# Protein Interaction Services

We identify binding partners  
for any type of protein



## We offer you

- Screening solutions for every protein class
- Extensive cDNA library collection
- 10 years of screening experience – hundreds of screens performed successfully
- Trusted service partner for Industry and Academia worldwide
- Service models for every budget
- Flexible pricing – you only pay for results

# Protein screening services

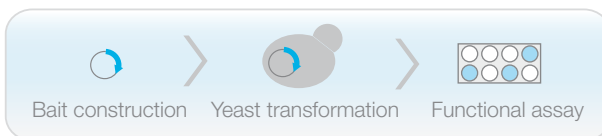
## The services that meet highest expectations

Our highly optimized yeast two-hybrid technologies attack the two major pitfalls of the classical two-hybrid systems: false positives and false negatives.

Using our triple yeast reporter strain we set a high level of stringency. Our mating-based library transformation approach guarantees highest coverage rates (> 10 x library complexity) resulting in exhaustive, reproducible screenings. State-of-the-art normalized libraries further decrease false positive rates and enable detection of rare interactors. With our data filtering tool we remove sticky proteins and our bait-dependency test verifies that the screening results are experimentally reproducible and therefore specific.

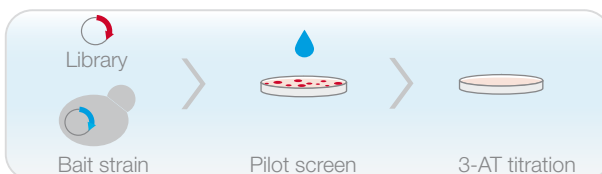
### Service procedure

#### Part I: Bait construction and analysis



#### Part II: Library screen and clone analysis

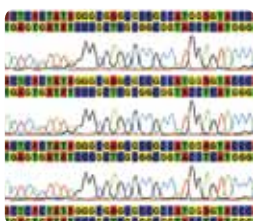
Optimization of screening conditions: the bait is carefully optimized using a series of pilot screens



The bait is screened against a cDNA library of your choice using either high efficiency mating or sequential transformation



#### Data filtering and clone ranking



Using sophisticated bioinformatic analysis tools we compare your screening results with a comprehensive background database to eliminate highly connected false positive interactors. All interactors are ranked according to the quality of the interaction (confidence level).

#### We guarantee

- Libraries of the highest complexity
- Exhaustive library screening
- Delivery of 30 interactors per screen on average
- Flagging of sticky proteins
- Best value for money on the market
- 95% customer satisfaction

**More than 60 publications in peer reviewed journals with an average impact factor of 9.6 show the high impact of our technologies.**

Download: [www.dualsystems.com/protein-interaction-discovery](http://www.dualsystems.com/protein-interaction-discovery)



#### Advantages

##### Part I

- Highly sensitive functional assay to verify bait expression and localization

##### Part II

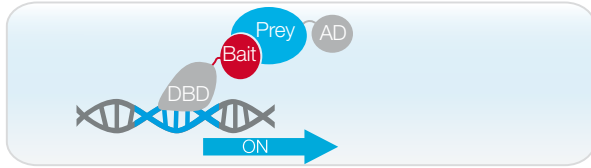
- Triple yeast reporter strain (HIS3, ADE2, LacZ) to decrease false positive rates
- High efficiency LiquiMate™ mating guarantees complete cDNA library coverage (> 10 x library complexity)
- Normalized cDNA libraries decrease false positive rates and enable detection of rare interactors
- Semi-quantitative liquid LacZ assay to determine the strength of an interaction

#### Deliverables

- 5' end sequences of all positive clones
- Clone analysis, including BLAST search results and clone grouping according to confidence level
- Complete report

## ■ DUALhybrid screening services for nuclear and cytosolic proteins

### DUALhybrid technology



The bait is expressed in yeast as a fusion protein with the DNA-binding domain (DBD) of a yeast transcription factor. The prey is expressed in the same yeast cell as a fusion protein with the activation domain of the same transcription factor. Upon interaction of bait and prey, the transcription factor is reconstituted and activates the reporter gene (blue arrow), resulting in growth of the yeast cells under selection.

### Selected publications

- Aaman et al. *FASEB J.* **24**, 2334-2346 (2010)
- Kajiwara et al. *PLoS ONE.* **4**(4), e5071 (2009)
- Ahnesorg et al. *Cell* **124**(2), 301-313 (2006)
- Hipp et al. *J. Biol. Chem.* **279**(16), 16503-16510 (2004)

### Ordering information: DUALhybrid services

Order number	Silver S01200	Gold S01300	Platinum S01400
Bait cloning	✗	✗	✓
Functional assay	✓	✓	✓
Library screen	✓	✓	✓
Clone picking	✓	✓	✓
Clone analysis	✗	✓	✓

### Applications

- Identify novel interactors of your protein of interest
- Characterize binary protein interactions
- Define binding motifs by domain mapping

### List of DUALhybrid cDNA libraries

#### Human Tissue

normalized universal | normalized brain | brain (fetal) | bone marrow | colon | heart | kidney | leukocytes | liver | lymph node | ovary | pancreas | placenta | skeletal muscle | small intestine | spleen | testis

#### Human Cell Lines

normalized HeLa S3 cells | HeLa | hepatocellular carcinoma cells | keratinocytes | LNCaP prostate cancer cells

#### Mouse

normalized universal | normalized brain | normalized embryonic stem cell | brain | embryo 11 days | embryo 17 days | testis

#### Rat

liver

#### Microorganisms

*E. coli*: genomic library

#### Model Organisms

*Drosophila*: normalized universal | whole animal | whole embryo

*Arabidopsis thaliana*: normalized universal | mixed tissues | green vegetative tissue

*C. elegans*: whole animal

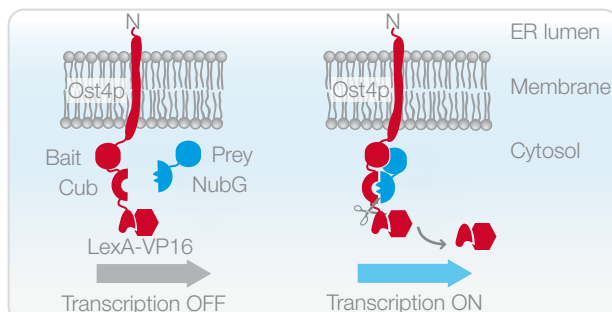
*S. cerevisiae*: whole organism

### NEW - normalized cDNA libraries

human universal | human brain | HeLa S3 cells | mouse universal | mouse brain | mouse embryonic stem cell | *Drosophila* universal | *Arabidopsis thaliana* universal

## ■ DUALmembrane screening services for all classes of membrane proteins

### DUALmembrane technology



Interaction of bait (A) and prey (B) at the membrane leads to reconstitution of split-ubiquitin through the interaction of Cub and NubG. Split-ubiquitin is cleaved by specific proteases to release the transcription factor, which enters the nucleus and activates reporter genes (C), resulting in growth of the yeast cells under selection.

The DUALmembrane system uses the same cDNA libraries as the DUALhunter system. Please see next page.

### Applications

- Identify novel interactors of your membrane protein of interest
- Characterize binary protein interactions between membrane proteins
- Compatible with GPCRs, RTKs, ion channels

### Selected publications

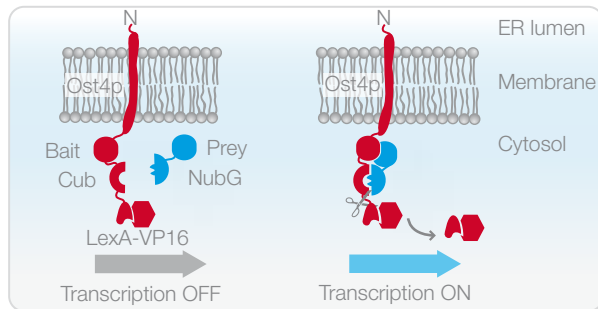
- Egana, L.A. et al. *J Neurosci.* **29**(14), 4592-604 (2009)
- Felkl and Leube *Neuroscience* **156**(2):344-352 (2008)
- Paumi et al. *Mol. Cell* **26**(1):15-25 (2007)
- Thaminy et al. *Genome Research* **13**:1744-53 (2003)

### Ordering information: DUALmembrane services

Order number	Service
S02110	DUALmembrane services, part I
S02111	DUALmembrane services, part II

## ■ DUALhunter screening services for transcription factors

### DUALhunter technology



A bait is constructed by fusing a protein of interest at its N-terminus to a small membrane anchor and at its C-terminus to the C-terminal half of ubiquitin (Cub) and a transcription factor. The bait is inserted into the membranes of yeast.

Interaction of bait and prey at the membrane leads to reconstitution of split-ubiquitin through the interaction of Cub and NubG. Split-ubiquitin is cleaved by specific proteases to release the transcription factor, which enters the nucleus and activates reporter genes, resulting in growth of the yeast cells under selection.

### List of DUALmembrane/DUALhunter cDNA libraries

#### Human Tissue I NubG-x

human adult brain | human embryonal brain | human adult colon | human adult liver | human adult kidney | human adult lung | mammary epithelial cells

#### Human Tissue I x-NubG

human adult brain | human adult kidney

#### Cell Lines I NubG-x

Jurkat T cells, unstimulated | HeLa cell line | LNCaP cell line

#### Rat I NubG-x

rat neonatal cardiomyocytes

#### Mouse I NubG-x

adult whole brain | adult heart | adult kidney | whole embryo, 11 days

## ■ Pairwise interaction services

- Pairwise interaction assay to determine whether two proteins interact directly
- Interaction domain mapping
- Comparative interaction studies between wild type and mutant variants of a protein
- Fast and simple service
- Up to 96 interactions tested in parallel

### Applications

- Identify novel interactors, acidic proteins and transcription factors
- Screening of proteins which are self-activating in classical two-hybrid systems
- Characterize binary protein interactions

### Selected publications

- Möckli et al. *BioTechniques* **42**(6):725-730 (2007)

### Ordering information: DUALhunter services

Order number	Service
S05110	DUALhunter services, part I
S05111	DUALhunter services, part II

#### Mouse I x-NubG

adult heart | adult spleen | whole embryo 17 days

#### Model Organisms I NubG-x

*Drosophila* | *Drosophila* whole embryo (16 hours) | *C. elegans* adult | *C. elegans* eggs | *Arabidopsis thaliana* | Medicago nodules | *S. cerevisiae*

#### Model Organisms I x-NubG

Medicago nodules

### NEW - normalized libraries

#### Normalized cDNA libraries I NubG-x

Mouse brain | Human spleen | Human fetal brain

#### Normalized cDNA libraries I x-NubG

Mouse whole embryo 17 days

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