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Various stimuli documented to activate natural genetic engineering

Signal or condition	Natural genetic engineering function	Organism(s)	Reference
Quorum pheromones	DNA release and competence for DNA uptake	Multiple bacteria	(Miller and Bassler 2001; Sturme, Kleerebezem et al. 2002; Spoering and Gilmore 2006)
Chitin	Competence for DNA uptake	Vibrio cholerae	(Meibom, Blokesch et al. 2005)
Various stress conditions	Competence for DNA uptake	Gram-positive bacteria	(Claverys, Prudhomme et al. 2006)
DNA damage	Recombination and mutator polymerases (SOS response)	<i>Escherichia coli</i> , <i>Bacillus subtilis</i> and other bacteria	(Sutton, Smith et al. 2000; Au, Kuester-Schoeck et al. 2005)
DNA damage	Prophage excision	<i>E. coli</i> , <i>B. subtilis</i> and other bacteria	(Goranov, Kuester-Schoeck et al. 2006; Rokney, Kobiler et al. 2008).
DNA damage	Horizontal transfer of integrated conjugative (ICE) elements	Multiple bacteria	(Beaber, Hochhut et al. 2004; Auchtung, Lee et al. 2005).
DNA damage	ISDra2 transposition	<i>Deinococcus radiodurans</i>	(Pasternak, Ton-Hoang et al. 2010)
DNA damage	Genetic exchange	<i>Helicobacter pylori</i>	(Dorer, Fero et al. 2010)
UV irradiation	Tn10 transposition	<i>E. coli</i>	(Eichenbaum and Livneh 1998)
Oxidative stress	SOS responses, prophage induction	Multiple bacteria	(Giuliodori, Gualerzi et al. 2007; Selva, Viana et al. 2009)
Chemical damage	SOS response	<i>E. coli</i> , <i>Salmonella typhimurium</i>	(Mersch-Sundermann, Mochayedi et al. 1993; Mersch-Sundermann, Rosenkranz et al. 1994; Mersch-Sundermann, Schneider et al. 1994)

Antibiotic	SOS response	<i>E. coli</i>	(Phillips, Culebras et al. 1987 ; Miller, Thomsen et al. 2004)
Antibiotic	Competence for DNA uptake	<i>Staphylococcus aureus</i>	(Prudhomme, Attaiach et al. 2006)
Antibiotic	Prophage excision	<i>Staphylococcus aureus</i>	(Goerke, Kölle et al. 2006)
Antibiotic (beta lactam)	SOS response and horizontal DNA transfer	<i>Staphylococcus aureus</i>	(Maiques, Ubeda et al. 2006)
Antibiotic	Mutator polymerase	<i>E. coli</i>	(Pérez-Capilla, Baquero et al. 2005)
Tetracycline	CTnDOT excision and conjugal transfer	<i>Bacteroides sp.</i>	(Moon, Shoemaker et al. 2005)
Quorum pheromones, plant metabolites (opines)	Conjugal transfer	<i>Agrobacterium tumefaciens</i>	(Fuqua and Winans 1994)
Plant phenolics	T-DNA transfer to plant cell	<i>A. tumefaciens</i>	(Gelvin 2006)
Magnetic fields	Tn5 transposition	<i>E. coli</i>	(Chow and Tung 2000)
Magnetic fields	Tn10 transposition	<i>E. coli</i>	(Del Re, Garoia et al. 2003 ; Del Re, Bersani et al. 2004)
Heat shock	F plasmid transfer	<i>E. coli</i>	(Zahrl, Wagner et al. 2007)
Growth phase	F plasmid transfer	<i>E. coli</i>	(Will, Lu et al. 2004)
Genome reduction	Stress-induced IS elements	<i>E. coli</i>	(Posfai, Plunkett et al. 2006)
Conjugation	ISPst9 transposition	<i>P. stutzeri</i>	(Christie-Oleza, Lanfranconi et al. 2009)
Sex pheromones	Conjugation agglutinins	<i>Enterobacter faecalis</i>	(Kozlowicz, Dworkin et al. 2006 ; Kozlowicz, Shi et al. 2006 ; Clewel 2007 ; Dunny 2007)
Nucleic acid precursors	Reduce competence	<i>Haemophilus influenzae</i>	(MacFadyen, Chen et al. 2001)

Aerobic starvation	Mu prophage activation	<i>E. coli</i>	(Maenhaut-Michel and Shapiro 1994) (Lamrani, Ranquet et al. 1999)
Stringent response (starvation-induced ppGpp synthesis)	Activation of IS element transcription and IS3 transposition	<i>Caulobacter crescentus</i>	(Boutte and Crosson 2011)
Aerobic starvation	Tn4652 activation	<i>Pseudomonas putida</i>	(Horak, Ilves et al. 2004 ; Ilves, Horak et al. 2004)
Aerobic starvation	Base substitutions	<i>E. coli</i>	(Bjedov, Tenaillon et al. 2003)
Aerobic starvation	Tandem duplications and amplifications	<i>Salmonella enterica</i>	(Kugelberg, Kofoid et al. 2006)
Aerobic starvation	Plasmid transfer and replication	<i>E. coli</i>	(Peters and Benson 1995 ; Peters, Bartoszyk et al. 1996)
Elevated temperature	IS element activation	<i>Burkholderia sp.</i>	(Taghavi, Mergeay et al. 1997 ; Ohtsubo, Genka et al. 2005)
Elevated temperature and high culture density	IS4Bsul element	<i>B. subtilis</i>	(Takahashi, Sekine et al. 2007)
Urinary tract infection	PolIV-dependent mutations	Uropathogenic <i>E. coli</i>	(Gawel and Seed 2011)
Adenine starvation	Ty1 retrotransposon activation	<i>Saccharomyces cerevisiae</i>	(Todeschini, Morillon et al. 2005) (Servant, Pennetier et al. 2008)
DNA damage (radiation or carcinogen)	Ty1 retrotransposon activation	<i>S. cerevisiae</i>	(Bradshaw and McEntee 1989 ; Sacerdot, Mercier et al. 2005 ; Stoycheva, Massardo et al. 2007)
Telomere erosion	Ty1 retrotransposon activation	<i>S. cerevisiae</i>	(Scholes, Kenny et al. 2003)
MAPK cascade activation during filamentous growth	Ty1 retrotransposon activation	<i>S. cerevisiae</i>	(Conte and Curcio 2000 ; Morillon, Springer et al. 2000)

Oxidative conditions (H_2O_2) mediated by SREBP transcription factor	Tf2 retrotransposon activation	<i>Schizosaccharomyces pombe</i>	(Sehgal, Lee et al. 2007)
Mating pheromone	Ty3 retrotransposon activation	<i>S. cerevisiae</i>	(Kinsey and Sandmeyer 1995)
Mating pheromone	Ty5 retrotransposon activity and transcription	<i>S. cerevisiae</i>	(Ke, Irwin et al. 1997)
Prion formation	Genome instability	<i>S. cerevisiae</i>	(True and Lindquist 2000)
Improper cryopreservation	Ty1 retrotransposition	<i>S. cerevisiae</i>	(Stamenova, Dimitrov et al. 2008)
Nitrogen starvation	LTR retrotransposon transcription	Diatom (<i>P. tricornutum</i>)	(Maumus, Allen et al. 2009)
Aldehyde (decadienal) treatment	LTR retrotransposon transcription	Diatom (<i>P. tricornutum</i>)	(Maumus, Allen et al. 2009)
DNA damage (Mitomycin C)	Transposon and retrotransposon activation	<i>Drosophila melanogaster</i>	(Georgiev, Korochkina et al. 1990)
DNA damage	Alu retransposition	<i>Homo sapiens</i>	(Hagan, Sheffield et al. 2003)
Gamma irradiation	LINE-1 retrtransposition	<i>Homo sapiens</i> (human osteosarcoma cells)	(Farkash, Kao et al. 2006)
Benzpyrene	LINE-1 retrotransposition	<i>Homo sapiens</i> (HeLa cells)	(Stribinskis and Ramos 2006)
Steroid hormones	Mouse mammary tumor virus (MMTV) activation	<i>Mus musculus</i>	(Truss, Chalepakis et al. 1992)

Plant alarm chemicals	Retrotransposon activation	<i>Nicotiana tabacum</i>	(Beguiristain, Grandbastien et al. 2001)
Free radical-generating agents, UVC or rose Bengal (RB)	Increased homologous recombination, systemically transmitted	Tobacco	(Filkowski, Yeoman et al. 2004)
Hydrostatic pressure Allopolyploidy	MITe DNA transposons DNA loss	rice <i>Brassica napus</i>	(Lin, Long et al. 2006) (Lukens, Pires et al. 2006)
Allopolyploidy	Chromosome locus rearrangements	<i>Arabidopsis suecica</i>	(Pontes, Neves et al. 2004)
Introgression	Retrotransposon activation	Rice	(Liu and Wendel 2000)
Cutting/wounding	Retrotransposon activation	<i>N. tabacum</i>	(Sugimoto, Takeda et al. 2000)
Protoplasting & growth in tissue culture	Transposon and retrotransposon activation various plants		(Hirochika 1993; Huang, Zhang et al. 2009)
Protoplasting & growth in tissue culture	Tos17 retrotransposon activation	rice	(Hirochika, Sugimoto et al. 1996)
Growth in tissue culture	mPing transposition	rice	(Ngezahayo, Xu et al. 2009)
Cell culture growth	1731 LTR retrotransposon	<i>D. melanogaster</i>	(Maisonneuve, Ogereau et al. 2007)
Cell culture growth	LINE-1 element retrotransposition	Mouse cell line	(Moran, Holmes et al. 1996)

Fungal metabolites	TnT1 retrotransposon	<i>Nicotiana tabacum</i>	(Melayah, Bonnivard et al. 2001)
Chlorine ions (not sodium)	DNA strand breaks and recombination	<i>Arabidopsis thaliana</i>	(Boyko, Hudson et al. 2006; Boyko, Golubov et al. 2010)
Nickel, Cadmium and other heavy metals	LINE-1 retrotransposition	<i>Homo sapiens</i> tissue culture cells	(El-Sawy, Kale et al. 2005; Kale, Moore et al. 2005; Kale, Carmichael et al. 2006)
Homologous recombination			
Temperature and day length		<i>Arabidopsis thaliana</i>	(Boyko, Filkowski et al. 2005)
Heavy metals	Transgenerational increase in homologous recombination	<i>Arabidopsis</i>	(Rahavi, Migicovsky et al. 2011)
Ethylnitrosourea	Transgenerational increase in mutation frequencies	<i>M. musculus</i>	(Dubrova, Hickenbotham et al. 2008)
<i>Toxoplasma gondii</i> infection	Endogenous retrovirus transcription	<i>H. sapiens</i> neuroepithelial cells	(Frank, Jones-Brando et al. 2006)
<i>Helicobacter pylori</i> infection	Adenocarcinoma with microsatellite instability; DS DNA breaks	human gastric mucosa	(Tahara 2004) (Li, Shi et al. 2005) (Moriichi, Watari et al. 2009 ; Toller, Neelsen et al. 2011)
Fungal or virus infection	(CT)n microsatellite contraction Increased somatic recombination and transposon activation; transmissible	wheat	(Schmidt and Mitter 2004) (Kovalchuk, Tryndyak et al. 2007)
Barley stripe mosaic virus (<i>Peronospora parasitica</i>) infection	systemic response in tobacco	<i>Arabidopsis</i> , maize and tobacco	(Kovalchuk, Kovalchuk et al. 2003)
Tobacco mosaic virus and oilseed rape mosaic virus infection	Increased somatic recombination (transmissible systemic response)	Tobacco, <i>Arabidopsis thaliana</i>	(Dong 2004; Boyko, Kathiria et al. 2007)

Temperature	Amplification/reduction in repetitive elements	<i>Festuca arundinacea</i> (Tall Fescue)	(Ceccarelli, Esposto et al. 2002)
Elevation and moisture	BARE-1 retrotransposition	<i>Hordeum spontaneum</i> (wild barley)	(Kalendar, Tanskanen et al. 2000)
Abiotic and biotic stresses	OARE-1 retrotransposon activation	Oat (<i>Avena sativa</i>)	(Kimura, Tosa et al. 2001)
Heat shock, toxic chemicals	SINE transcription	<i>Bombyx morii</i>	(Kimura, Choudary et al. 1999; Kimura, Choudary et al. 2001)
Various stress conditions	SINE transcription	<i>H. sapiens</i>	(Li and Schmid 2001)
Heat shock	B1 SINE transcription	<i>M. musculus</i>	(Li, Spearow et al. 1999)
Cell stress and translation inhibitors	SINE transcription	<i>M. musculus</i>	(Liu, Chu et al. 1995)
Industrial air pollution	Microsatellite expansion	<i>M. musculus</i>	(Somers, Yauk et al. 2002)
Particulate air pollution	Germ-line mutations	Mouse	(Yauk, Polyzos et al. 2008)
Chemical mutagens and etoposide	Microsatellite expansion	<i>M. musculus</i>	(Vilarino-Guell, Smith et al. 2003)
Multiple chemicals	Multiple transgenerational instabilities	Multiple target organisms	(Nomura 2008)

Diet (extra folic acid, vitamin B12 choline, and betaine)	IAP retrotransposon at <i>Agouti</i> locus (<i>Avy</i> allele)	<i>M. musculus</i>	(Waterland and Jirtle 2003)
Lymphocyte differentiation and antigen activation	Activation of VDJ joining, somatic hypermutation and heavy chain class switching	<i>M. musculus</i> and <i>H. sapiens</i>	(Gellert 1997 ; Honjo, Kinoshita et al. 2002 ; Alt 2007)
Neuronal differentiation and exercise	LINE-1 retrotransposition	<i>M. musculus</i>	(Muotri, Chu et al. 2005 ; Muotri, Zhao et al. 2009); (Coufal, Garcia-Perez et al. 2009)
Hybrid dysgenesis	P factor transposon	<i>D. melanogaster</i>	(Kidwell 1985 ; Kidwell, Kimura et al. 1988) (Kocur, Drier et al. 1986)
			(Fawcett, Lister et al. 1986 ; Bucheton 1990 ; Busseau, Chaboissier et al. 1994 ; Sezutsu, Nitasaka et al. 1995 ; de La Roche Saint Andre and Bregliano 1998 ; Gauthier, Tatout et al. 2000)
Hybrid dysgenesis	I factor non-LTR retrotransposon	<i>D. melanogaster</i>	(Yannopoulos, Stamatis et al. 1987) (Simmons 1992)
Hybrid dysgenesis	Hobo transposon	<i>D. melanogaster</i>	(Galindo, Ladeuze et al. 1995 ; Bazin, Denis et al. 1999); (Bazin, Dejonghe et al. 2004)
Hybrid dysgenesis	Penelope retrotransposon and other transposable elements	<i>D. virilis</i>	(Scheinker, Lozovskaya et al. 1990 ; Zelentsova, Poluectova et al. 1999 ; Evgen'ev, Zelentsova et al. 2000 ; Lyozin, Makarova et al. 2001 ; Pyatkov, Shostak et al. 2002 ;
Hybrid dysgenesis	Mariner/Tc1, hAT transposons and gypsy/Ty3 LTR retrotransposons	Medfly (<i>Ceratitis capitata</i>)	Blumenstiel and Hartl 2005 ; (Evgen'ev and Arkhipova 2005)
			(Torti, Gomulski et al. 1997 ; Gomulski, Torti et al. 2004)

REFERENCES

Alt, F. W. (2007). "From gene amplification to V(D)J recombination and back: a personal account of my early years in B cell biology." *Eur J Immunol* **37 Suppl 1**: S138-147. <http://www.ncbi.nlm.nih.gov/pubmed/17972338>.

- Au, N., E. Kuester-Schoeck, et al. (2005). "Genetic composition of the *Bacillus subtilis* SOS system." *J Bacteriol* **187**(22): 7655-7666. <http://www.ncbi.nlm.nih.gov/pubmed/16267290>.
- Auchtung, J. M., C. A. Lee, et al. (2005). "Regulation of a *Bacillus subtilis* mobile genetic element by intercellular signaling and the global DNA damage response." *Proc Natl Acad Sci U S A* **102**(35): 12554-12559. <http://www.ncbi.nlm.nih.gov/pubmed/16105942>.
- Bazin, C., B. Dejonghe, et al. (2004). "Is hobo permissivity related to I reactivity and sensitive to chromatin compaction in *Drosophila melanogaster*?" *Genet Res* **84**(2): 71-79. <http://www.ncbi.nlm.nih.gov/pubmed/15678744>.
- Bazin, C., B. Denis, et al. (1999). "Characterization of permissivity for hobo-mediated gonadal dysgenesis in *Drosophila melanogaster*." *Mol Gen Genet* **261**(3): 480-486. <http://www.ncbi.nlm.nih.gov/pubmed/10323228>.
- Beaber, J. W., B. Hochhut, et al. (2004). "SOS response promotes horizontal dissemination of antibiotic resistance genes." *Nature* **427**(6969): 72-74. <http://www.ncbi.nlm.nih.gov/pubmed/14688795>.
- Beguiristain, T., M. A. Grandbastien, et al. (2001). "Three Tnt1 subfamilies show different stress-associated patterns of expression in tobacco. Consequences for retrotransposon control and evolution in plants." *Plant Physiol* **127**(1): 212-221. <http://www.ncbi.nlm.nih.gov/pubmed/11553749>.
- Bjedov, I., O. Tenaillon, et al. (2003). "Stress-induced mutagenesis in bacteria." *Science* **300**(5624): 1404-1409. <http://www.ncbi.nlm.nih.gov/pubmed/12775833>.
- Blumenstiel, J. P. and D. L. Hartl (2005). "Evidence for maternally transmitted small interfering RNA in the repression of transposition in *Drosophila virilis*." *Proc Natl Acad Sci U S A* **102**(44): 15965-15970. <http://www.ncbi.nlm.nih.gov/pubmed/16247000>.
- Boutte, C. C. and S. Crosson (2011). "The complex logic of stringent response regulation in *Caulobacter crescentus*: starvation signalling in an oligotrophic environment." *Mol Microbiol*. <http://www.ncbi.nlm.nih.gov/pubmed/21338423>.
- Boyko, A., J. Filkowski, et al. (2005). "Homologous recombination in plants is temperature and day-length dependent." *Mutat Res* **572**(1-2): 73-83. <http://www.ncbi.nlm.nih.gov/pubmed/15790491>.
- Boyko, A., A. Golubov, et al. (2010). "Chlorine ions but not sodium ions alter genome stability of *Arabidopsis thaliana*." *Plant Cell Physiol* **51**(6): 1066-1078. <http://www.ncbi.nlm.nih.gov/pubmed/20385609>.
- Boyko, A., D. Hudson, et al. (2006). "Increase of homologous recombination frequency in vascular tissue of *Arabidopsis* plants exposed to salt stress." *Plant Cell Physiol* **47**(6): 736-742. <http://www.ncbi.nlm.nih.gov/pubmed/16608867>.
- Boyko, A., P. Kathiria, et al. (2007). "Transgenerational changes in the genome stability and methylation in pathogen-infected plants: (virus-induced plant genome instability)." *Nucleic Acids Res* **35**(5): 1714-1725. <http://www.ncbi.nlm.nih.gov/pubmed/17311811>.
- Bradshaw, V. A. and K. McEntee (1989). "DNA damage activates transcription and transposition of yeast Ty retrotransposons." *Mol Gen Genet* **218**(3): 465-474. <http://www.ncbi.nlm.nih.gov/pubmed/2555668>.
- Bucheton, A. (1990). "I transposable elements and I-R hybrid dysgenesis in *Drosophila*." *Trends Genet* **6**(1): 16-21. <http://www.ncbi.nlm.nih.gov/pubmed/2158161>.
- Busseau, I., M. C. Chaboissier, et al. (1994). "I factors in *Drosophila melanogaster*: transposition under control." *Genetica* **93**(1-3): 101-116. <http://www.ncbi.nlm.nih.gov/pubmed/7813907>.
- Ceccarelli, M., C. Esposto, et al. (2002). "Genome plasticity in *Festuca arundinacea*: direct response to temperature changes by redundancy modulation of interspersed DNA repeats." *Theor Appl Genet* **104**(6-7): 901-907. <http://www.ncbi.nlm.nih.gov/pubmed/12582594>.
- Chow, K. C. and W. L. Tung (2000). "Magnetic field exposure stimulates transposition through the induction of DnaK/J synthesis." *Biochem Biophys Res Commun* **270**(3): 745-748. <http://www.ncbi.nlm.nih.gov/pubmed/10772895>.

- Christie-Oleza, J. A., M. P. Lanfranconi, et al. (2009). "Conjugative interaction induces transposition of ISPst9 in *Pseudomonas stutzeri* AN10." *J Bacteriol* **191**(4): 1239-1247. <http://www.ncbi.nlm.nih.gov/pubmed/19060139>.
- Claverys, J. P., M. Prudhomme, et al. (2006). "Induction of competence regulons as a general response to stress in gram-positive bacteria." *Annu Rev Microbiol* **60**: 451-475. <http://www.ncbi.nlm.nih.gov/pubmed/16771651>.
- Clewell, D. B. (2007). "Properties of *Enterococcus faecalis* plasmid pAD1, a member of a widely disseminated family of pheromone-responding, conjugative, virulence elements\ encoding cytolsin." *Plasmid* **50**(3): 205-227. <http://www.ncbi.nlm.nih.gov/pubmed/17590438>.
- Conte, D., Jr. and M. J. Curcio (2000). "Fus3 controls Ty1 transpositional dormancy through the invasive growth MAPK pathway." *Mol Microbiol* **35**(2): 415-427. <http://www.ncbi.nlm.nih.gov/pubmed/10652102>.
- Coufal, N. G., J. L. Garcia-Perez, et al. (2009). "L1 retrotransposition in human neural progenitor cells." *Nature* **460**(7259): 1127-1131. <http://www.ncbi.nlm.nih.gov/pubmed/19657334>.
- de La Roche Saint Andre, C. and J. C. Bregliano (1998). "Evidence for a multistep control in transposition of I factor in *Drosophila melanogaster*." *Genetics* **148**(4): 1875-1884. <http://www.ncbi.nlm.nih.gov/pubmed/9560401>.
- Del Re, B., F. Bersani, et al. (2004). "Various effects on transposition activity and survival of *Escherichia coli* cells due to different ELF-MF signals." *Radiat Environ Biophys* **43**(4): 265-270. <http://www.ncbi.nlm.nih.gov/pubmed/15645314>.
- Del Re, B., F. Garoia, et al. (2003). "Extremely low frequency magnetic fields affect transposition activity in *Escherichia coli*." *Radiat Environ Biophys* **42**(2): 113-118. <http://www.ncbi.nlm.nih.gov/pubmed/12768290>.
- Dong, X. (2004). "Pathogen-induced systemic DNA rearrangement in plants." *Trends Plant Sci* **9**(2): 60-61. <http://www.ncbi.nlm.nih.gov/pubmed/15106587>.
- Dorer, M. S., J. Fero, et al. (2010). "DNA damage triggers genetic exchange in *Helicobacter pylori*." *PLoS Pathog* **6**(7): e1001026. <http://www.ncbi.nlm.nih.gov/pubmed/20686662>.
- Dubrova, Y. E., P. Hickenbotham, et al. (2008). "Paternal exposure to ethylnitrosourea results in transgenerational genomic instability in mice." *Environ Mol Mutagen* **49**(4): 308-311. <http://www.ncbi.nlm.nih.gov/pubmed/18366099>.
- Dunny, G. M. (2007). "The peptide pheromone-inducible conjugation system of *Enterococcus faecalis* plasmid pCF10: cell-cell signalling, gene transfer, complexity and evolution." *Philos Trans R Soc Lond B Biol Sci* **362**(1483): 1185-1193. <http://www.ncbi.nlm.nih.gov/pubmed/17360276>.
- Eichenbaum, Z. and Z. Livneh (1998). "UV light induces IS10 transposition in *Escherichia coli*." *Genetics* **149**(3): 1173-1181. <http://www.ncbi.nlm.nih.gov/pubmed/9649512>.
- El-Sawy, M., S. P. Kale, et al. (2005). "Nickel stimulates L1 retrotransposition by a post-transcriptional mechanism." *J Mol Biol* **354**(2): 246-257. <http://www.ncbi.nlm.nih.gov/pubmed/16249005>.
- Evgen'ev, M., H. Zelentsova, et al. (2000). "Invasion of *Drosophila virilis* by the Penelope transposable element." *Chromosoma* **109**(5): 350-357. <http://www.ncbi.nlm.nih.gov/pubmed/11007494>.
- Evgen'ev, M. B. and I. R. Arkhipova (2005). "Penelope-like elements--a new class of retroelements: distribution, function and possible evolutionary significance." *Cytogenet Genome Res* **110**(1-4): 510-521. <http://www.ncbi.nlm.nih.gov/pubmed/16093704>.
- Farkash, E. A., G. D. Kao, et al. (2006). "Gamma radiation increases endonuclease-dependent L1 retrotransposition in a cultured cell assay." *Nucleic Acids Res* **34**(4): 1196-1204. <http://www.ncbi.nlm.nih.gov/pubmed/16507671>.
- Fawcett, D. H., C. K. Lister, et al. (1986). "Transposable elements controlling I-R hybrid dysgenesis in *D. melanogaster* are similar to mammalian LINEs." *Cell* **47**(6): 1007-1015. <http://www.ncbi.nlm.nih.gov/pubmed/2430722>.

- Filkowski, J., A. Yeoman, et al. (2004). "Systemic plant signal triggers genome instability." *Plant J* **38**(1): 1-11. <http://www.ncbi.nlm.nih.gov/pubmed/15053755>.
- Frank, O., L. Jones-Brando, et al. (2006). "Altered transcriptional activity of human endogenous retroviruses in neuroepithelial cells after infection with Toxoplasma gondii." *J Infect Dis* **194**(10): 1447-1449. <http://www.ncbi.nlm.nih.gov/pubmed/17054075>.
- Fuqua, W. C. and S. C. Winans (1994). "A LuxR-LuxI type regulatory system activates Agrobacterium Ti plasmid conjugal transfer in the presence of a plant tumor metabolite." *J Bacteriol* **176**(10): 2796-2806. <http://www.ncbi.nlm.nih.gov/pubmed/8188582>.
- Galindo, M. I., V. Ladeveze, et al. (1995). "Spread of the autonomous transposable element hobo in the genome of *Drosophila melanogaster*." *Mol Biol Evol* **12**(5): 723-734. <http://www.ncbi.nlm.nih.gov/pubmed/7476120>.
- Gauthier, E., C. Tatout, et al. (2000). "Artificial and epigenetic regulation of the I factor, a nonviral retrotransposon of *Drosophila melanogaster*." *Genetics* **156**(4): 1867-1878. <http://www.ncbi.nlm.nih.gov/pubmed/11102380>.
- Gawel, D. and P. C. Seed (2011). "Urinary tract infection drives genome instability in uropathogenic *Escherichia coli* and necessitates translesion synthesis DNA polymerase IV for virulence." *Virulence* **2**(3): 222-232. <http://www.ncbi.nlm.nih.gov/pubmed/21597325>.
- Gellert, M. (1997). "Recent advances in understanding V(D)J recombination." *Adv Immunol* **64**: 39-64. <http://www.ncbi.nlm.nih.gov/pubmed/9100979>.
- Gelvin, S. B. (2006). "Agrobacterium virulence gene induction." *Methods Mol Biol* **343**: 77-84. <http://www.ncbi.nlm.nih.gov/pubmed/16988335>.
- Georgiev, P. G., S. E. Korochkina, et al. (1990). "Mitomycin C induces genomic rearrangements involving transposable elements in *Drosophila melanogaster*." *Mol Gen Genet* **220**(2): 229-233. <http://www.ncbi.nlm.nih.gov/pubmed/2157952>.
- Giuliodori, A. M., C. O. Gualerzi, et al. (2007). "Review on bacterial stress topics." *Ann N Y Acad Sci* **1113**: 95-104. <http://www.ncbi.nlm.nih.gov/pubmed/17483204>.
- Goerke, C., J. Köller, et al. (2006). "Ciprofloxacin and trimethoprim cause phage induction and virulence modulation in *Staphylococcus aureus*." *Antimicrob Agents Chemother* **50**(1): 171-177.
- Gomulski, L. M., C. Torti, et al. (2004). "Medfly transposable elements: diversity, evolution, genomic impact and possible applications." *Insect Biochem Mol Biol* **34**(2): 139-148. <http://www.ncbi.nlm.nih.gov/pubmed/14871610>.
- Goranov, A. I., E. Kuester-Schoeck, et al. (2006). "Characterization of the global transcriptional responses to different types of DNA damage and disruption of replication in *Bacillus subtilis*." *J Bacteriol* **188**(15): 5595-5605. <http://www.ncbi.nlm.nih.gov/pubmed/16855250>.
- Hagan, C. R., R. F. Sheffield, et al. (2003). "Human Alu element retrotransposition induced by genotoxic stress." *Nat Genet* **35**(3): 219-220. <http://www.ncbi.nlm.nih.gov/pubmed/1457886>.
- Hirochika, H. (1993). "Activation of tobacco retrotransposons during tissue culture." *Embo J* **12**(6): 2521-2528. <http://www.ncbi.nlm.nih.gov/pubmed/8389699>.
- Hirochika, H., K. Sugimoto, et al. (1996). "Retrotransposons of rice involved in mutations induced by tissue culture." *Proc Natl Acad Sci U S A* **93**(15): 7783-7788. <http://www.ncbi.nlm.nih.gov/pubmed/8755553>.
- Honjo, T., K. Kinoshita, et al. (2002). "Molecular mechanism of class switch recombination: linkage with somatic hypermutation." *Annu Rev Immunol* **20**: 165-196. <http://www.ncbi.nlm.nih.gov/pubmed/11861601>.
- Horak, R., H. Ilves, et al. (2004). "The ColR-ColS two-component signal transduction system is involved in regulation of Tn4652 transposition in *Pseudomonas putida* under starvation conditions." *Mol Microbiol* **54**(3): 795-807. <http://www.ncbi.nlm.nih.gov/pubmed/15491368>.
- Huang, J., K. Zhang, et al. (2009). "Identification of a high frequency transposon induced by tissue culture, nDaiZ, a member of the hAT family in rice." *Genomics* **93**(3): 274-281. <http://www.ncbi.nlm.nih.gov/pubmed/19071208>.
- Ilves, H., R. Horak, et al. (2004). "IHF is the limiting host factor in transposition of *Pseudomonas putida* transposon Tn4652 in stationary phase." *Mol Microbiol* **51**(6): 1773-1785. <http://www.ncbi.nlm.nih.gov/pubmed/15009901>.

- Kale, S. P., M. C. Carmichael, et al. (2006). "The L1 retrotranspositional stimulation by particulate and soluble cadmium exposure is independent of the generation of DNA breaks." *Int J Environ Res Public Health* **3**(2): 121-128. <http://www.ncbi.nlm.nih.gov/pubmed/16823085>.
- Kale, S. P., L. Moore, et al. (2005). "Heavy metals stimulate human LINE-1 retrotransposition." *Int J Environ Res Public Health* **2**(1): 14-23. <http://www.ncbi.nlm.nih.gov/pubmed/16705797>.
- Kalendar, R., J. Tanskanen, et al. (2000). "Genome evolution of wild barley (*Hordeum spontaneum*) by BARE-1 retrotransposon dynamics in response to sharp microclimatic divergence." *Proc Natl Acad Sci U S A* **97**(12): 6603-6607. <http://www.ncbi.nlm.nih.gov/pubmed/10823912>.
- Ke, N., P. A. Irwin, et al. (1997). "The pheromone response pathway activates transcription of Ty5 retrotransposons located within silent chromatin of *Saccharomyces cerevisiae*." *Embo J* **16**(20): 6272-6280. <http://www.ncbi.nlm.nih.gov/pubmed/9321406>.
- Kidwell, M. G. (1985). "Hybrid dysgenesis in *Drosophila melanogaster*: nature and inheritance of P element regulation." *Genetics* **111**(2): 337-350. <http://www.ncbi.nlm.nih.gov/pubmed/2996978>.
- Kidwell, M. G., K. Kimura, et al. (1988). "Evolution of hybrid dysgenesis potential following P element contamination in *Drosophila melanogaster*." *Genetics* **119**(4): 815-828. <http://www.ncbi.nlm.nih.gov/pubmed/2842225>.
- Kimura, R. H., P. V. Choudary, et al. (1999). "Silk worm Bm1 SINE RNA increases following cellular insults." *Nucleic Acids Res* **27**(16): 3380-3387. <http://www.ncbi.nlm.nih.gov/pubmed/10454647>.
- Kimura, R. H., P. V. Choudary, et al. (2001). "Stress induction of Bm1 RNA in silkworm larvae: SINEs, an unusual class of stress genes." *Cell Stress Chaperones* **6**(3): 263-272. <http://www.ncbi.nlm.nih.gov/pubmed/11599568>.
- Kimura, Y., Y. Tosa, et al. (2001). "OARE-1, a Ty1-copia retrotransposon in oat activated by abiotic and biotic stresses." *Plant Cell Physiol* **42**(12): 1345-1354. <http://www.ncbi.nlm.nih.gov/pubmed/11773527>.
- Kinsey, P. T. and S. B. Sandmeyer (1995). "Ty3 transposes in mating populations of yeast: a novel transposition assay for Ty3." *Genetics* **139**(1): 81-94. <http://www.ncbi.nlm.nih.gov/pubmed/7705653>.
- Kocur, G. J., E. A. Drier, et al. (1986). "Sterility and hypermutability in the P-M system of hybrid dysgenesis in *Drosophila melanogaster*." *Genetics* **114**(4): 1147-1163. <http://www.ncbi.nlm.nih.gov/pubmed/3100389>.
- Kovalchuk, I., O. Kovalchuk, et al. (2003). "Pathogen-induced systemic plant signal triggers DNA rearrangements." *Nature* **423**(6941): 760-762. <http://www.ncbi.nlm.nih.gov/pubmed/12802336>.
- Kovalchuk, O., V. P. Tryndyak, et al. (2007). "Estrogen-induced rat breast carcinogenesis is characterized by alterations in DNA methylation, histone modifications and aberrant microRNA expression." *Cell Cycle* **6**(16): 2010-2018. <http://www.ncbi.nlm.nih.gov/pubmed/17700064>.
- Kozlowicz, B. K., M. Dworkin, et al. (2006). "Pheromone-inducible conjugation in *Enterococcus faecalis*: a model for the evolution of biological complexity?" *Int J Med Microbiol* **296**(2-3): 141-147. <http://www.ncbi.nlm.nih.gov/pubmed/16503196>.
- Kozlowicz, B. K., K. Shi, et al. (2006). "Molecular basis for control of conjugation by bacterial pheromone and inhibitor peptides." *Mol Microbiol* **62**(4): 958-969. <http://www.ncbi.nlm.nih.gov/pubmed/17038121>.
- Kugelberg, E., E. Kofoid, et al. (2006). "Multiple pathways of selected gene amplification during adaptive mutation." *Proc Natl Acad Sci U S A* **103**(46): 17319-17324. <http://www.ncbi.nlm.nih.gov/pubmed/17082307>.
- Lamrani, S., C. Ranquet, et al. (1999). "Starvation-induced Mucts62-mediated coding sequence fusion: a role for ClpXP, Lon, RpoS and Crp." *Mol Microbiol* **32**(2): 327-343. <http://www.ncbi.nlm.nih.gov/pubmed/10231489>.

- Li, J. H., X. Z. Shi, et al. (2005). "Effect of Helicobacter pylori infection on p53 expression of gastric mucosa and adenocarcinoma with microsatellite instability." *World J Gastroenterol* **11**(28): 4363-4366. <http://www.ncbi.nlm.nih.gov/pubmed/16038035>.
- Li, T., J. Spearow, et al. (1999). "Physiological stresses increase mouse short interspersed element (SINE) RNA expression in vivo." *Gene* **239**(2): 367-372. <http://www.ncbi.nlm.nih.gov/pubmed/10548739>.
- Li, T. H. and C. W. Schmid (2001). "Differential stress induction of individual Alu loci: implications for transcription and retrotransposition." *Gene* **276**(1-2): 135-141. <http://www.ncbi.nlm.nih.gov/pubmed/11591480>.
- Lin, X., L. Long, et al. (2006). "In planta mobilization of mPing and its putative autonomous element Pong in rice by hydrostatic pressurization." *J Exp Bot* **57**(10): 2313-2323. <http://www.ncbi.nlm.nih.gov/pubmed/16818484>.
- Liu, B. and J. F. Wendel (2000). "Retrotransposon activation followed by rapid repression in introgressed rice plants." *Genome* **43**(5): 874-880. <http://www.ncbi.nlm.nih.gov/pubmed/11081978>.
- Liu, W. M., W. M. Chu, et al. (1995). "Cell stress and translational inhibitors transiently increase the abundance of mammalian SINE transcripts." *Nucleic Acids Res* **23**(10): 1758-1765. <http://www.ncbi.nlm.nih.gov/pubmed/7784180>.
- Lukens, L. N., J. C. Pires, et al. (2006). "Patterns of sequence loss and cytosine methylation within a population of newly resynthesized Brassica napus allopolyploids." *Plant Physiol* **140**(1): 336-348. <http://www.ncbi.nlm.nih.gov/pubmed/16377753>.
- Lyozin, G. T., K. S. Makarova, et al. (2001). "The structure and evolution of Penelope in the virilis species group of Drosophila: an ancient lineage of retroelements." *J Mol Evol* **52**(5): 445-456. <http://www.ncbi.nlm.nih.gov/pubmed/11443348>.
- MacFadyen, L. P., D. Chen, et al. (2001). "Competence development by Haemophilus influenzae is regulated by the availability of nucleic acid precursors." *Mol Microbiol* **40**(3): 700-707. <http://www.ncbi.nlm.nih.gov/pubmed/11359575>.
- Maenhaut-Michel, G. and J. A. Shapiro (1994). "The roles of starvation and selective substrates in the emergence of araB-lacZ fusion clones." *Embo J* **13**(21): 5229-5239. <http://www.ncbi.nlm.nih.gov/pubmed/7957088>.
- Maiques, E., C. Ubeda, et al. (2006). "Beta-lactam antibiotics induce the SOS response and horizontal transfer of virulence factors in *Staphylococcus aureus*." *J Bacteriol* **188**(7): 2726-2729. <http://www.ncbi.nlm.nih.gov/pubmed/16547063>.
- Maisonhaute, C., D. Ogereau, et al. (2007). "Amplification of the 1731 LTR retrotransposon in *Drosophila melanogaster* cultured cells: origin of neocopies and impact on the genome." *Gene* **393**(1-2): 116-126. <http://www.ncbi.nlm.nih.gov/pubmed/17382490>.
- Maumus, F., A. E. Allen, et al. (2009). "Potential impact of stress activated retrotransposons on genome evolution in a marine diatom." *BMC Genomics* **10**: 624. <http://www.ncbi.nlm.nih.gov/pubmed/20028555>.
- Meibom, K. L., M. Blokesch, et al. (2005). "Chitin induces natural competence in *Vibrio cholerae*." *Science* **310**(5755): 1824-1827..
- Melayah, D., E. Bonnivard, et al. (2001). "The mobility of the tobacco Tnt1 retrotransposon correlates with its transcriptional activation by fungal factors." *Plant J* **28**(2): 159-168. <http://www.ncbi.nlm.nih.gov/pubmed/11722759>.
- Mersch-Sundermann, V., S. Mochayedi, et al. (1993). "The genotoxicity of unsubstituted and nitrated polycyclic aromatic hydrocarbons." *Anticancer Res* **13**(6A): 2037-2043. <http://www.ncbi.nlm.nih.gov/pubmed/8297112>.
- Mersch-Sundermann, V., H. S. Rosenkranz, et al. (1994). "The structural basis of the genotoxicity of nitroarenofurans and related compounds." *Mutat Res* **304**(2): 271-284. <http://www.ncbi.nlm.nih.gov/pubmed/7506371>.
- Mersch-Sundermann, V., U. Schneider, et al. (1994). "SOS induction in *Escherichia coli* and *Salmonella* mutagenicity: a comparison using 330 compounds." *Mutagenesis* **9**(3): 205-224. <http://www.ncbi.nlm.nih.gov/pubmed/7934961>.

- Miller, C., L. E. Thomsen, et al. (2004). "SOS response induction by beta-lactams and bacterial defense against antibiotic lethality." *Science* **305**(5690): 1629-1631..
- Miller, M. B. and B. L. Bassler (2001). "Quorum sensing in bacteria." *Annu Rev Microbiol* **55**: 165-199. <http://www.ncbi.nlm.nih.gov/pubmed/11544353>.
- Moon, K., N. B. Shoemaker, et al. (2005). "Regulation of excision genes of the *Bacteroides* conjugative transposon CTnDOT." *J Bacteriol* **187**(16): 5732-5741. <http://www.ncbi.nlm.nih.gov/pubmed/16077120>.
- Moran, J. V., S. E. Holmes, et al. (1996). "High frequency retrotransposition in cultured mammalian cells." *Cell* **87**(5): 917-927. <http://www.ncbi.nlm.nih.gov/pubmed/8945518>.
- Moriuchi, K., J. Watari, et al. (2009). "Effects of *Helicobacter pylori* infection on genetic instability, the aberrant CpG island methylation status and the cellular phenotype in Barrett's esophagus in a Japanese population." *Int J Cancer* **124**(6): 1263-1269. <http://www.ncbi.nlm.nih.gov/pubmed/19048617>.
- Morillon, A., M. Springer, et al. (2000). "Activation of the *Kss1* invasive-filamentous growth pathway induces *Ty1* transcription and retrotransposition in *Saccharomyces cerevisiae*." *Mol Cell Biol* **20**(15): 5766-5776. <http://www.ncbi.nlm.nih.gov/pubmed/10891512>.
- Muotri, A. R., V. T. Chu, et al. (2005). "Somatic mosaicism in neuronal precursor cells mediated by *L1* retrotransposition." *Nature* **435**(7044): 903-910. <http://www.ncbi.nlm.nih.gov/pubmed/15959507>.
- Muotri, A. R., C. Zhao, et al. (2009). "Environmental influence on *L1* retrotransposons in the adult hippocampus." *Hippocampus* **19**(10): 1002-1007. <http://www.ncbi.nlm.nih.gov/pubmed/19771587>.
- Ngezahayo, F., C. Xu, et al. (2009). "Tissue culture-induced transpositional activity of mPing is correlated with cytosine methylation in rice." *BMC Plant Biol* **9**: 91. <http://www.ncbi.nlm.nih.gov/pubmed/19604382>.
- Nomura, T. (2008). "Transgenerational effects from exposure to environmental toxic substances." *Mutat Res* **659**(1-2): 185-193. <http://www.ncbi.nlm.nih.gov/pubmed/18406661>.
- Ohtsubo, Y., H. Genka, et al. (2005). "High-temperature-induced transposition of insertion elements in *burkholderia multivorans* ATCC 17616." *Appl Environ Microbiol* **71**(4): 1822-1828. <http://www.ncbi.nlm.nih.gov/pubmed/15812007>.
- Pasternak, C., B. Ton-Hoang, et al. (2010). "Irradiation-induced *Deinococcus radiodurans* genome fragmentation triggers transposition of a single resident insertion sequence." *PLoS Genet* **6**(1): e1000799. <http://www.ncbi.nlm.nih.gov/pubmed/20090938>.
- Pérez-Capilla, T., M. R. Baquero, et al. (2005). "SOS-independent induction of *dinB* transcription by beta-lactam-mediated inhibition of cell wall synthesis in *Escherichia coli*." *J Bacteriol* **187**(4): 1515-1518..
- Peters, J. E., I. M. Bartoszyk, et al. (1996). "Redundant homosexual F transfer facilitates selection-induced reversion of plasmid mutations." *J Bacteriol* **178**(11): 3037-3043. <http://www.ncbi.nlm.nih.gov/pubmed/8655477>.
- Peters, J. E. and S. A. Benson (1995). "Redundant transfer of F' plasmids occurs between *Escherichia coli* cells during nonlethal selections." *J Bacteriol* **177**(3): 847-850. <http://www.ncbi.nlm.nih.gov/pubmed/7836326>.
- Phillips, I., E. Culebras, et al. (1987). "Induction of the SOS response by new 4-quinolones." *J Antimicrob Chemother* **20**(5): 631-638. <http://www.ncbi.nlm.nih.gov/pubmed/3323160>.
- Pontes, O., N. Neves, et al. (2004). "Chromosomal locus rearrangements are a rapid response to formation of the allotetraploid *Arabidopsis suecica* genome." *Proc Natl Acad Sci U S A* **101**(52): 18240-18245. <http://www.ncbi.nlm.nih.gov/pubmed/15604143>.
- Posfai, G., G. Plunkett, 3rd, et al. (2006). "Emergent properties of reduced-genome *Escherichia coli*." *Science* **312**(5776): 1044-1046. <http://www.ncbi.nlm.nih.gov/pubmed/16645050>.

- Prudhomme, M., L. Attaiach, et al. (2006). "Antibiotic stress induces genetic transformability in the human pathogen *Streptococcus pneumoniae*." *Science* **313**(5783): 89-92. <http://www.ncbi.nlm.nih.gov/pubmed/16825569>.
- Pyatkov, K. I., N. G. Shostak, et al. (2002). "Penelope retroelements from *Drosophila virilis* are active after transformation of *Drosophila melanogaster*." *Proc Natl Acad Sci U S A* **99**(25): 16150-16155. <http://www.ncbi.nlm.nih.gov/pubmed/12451171>.
- Rahavi, M. R., Z. Migicovsky, et al. (2011). "Transgenerational adaptation to heavy metal salts in *Arabidopsis*." *Front Plant Sci* **2**: 91. <http://www.ncbi.nlm.nih.gov/pubmed/22639617>.
- Rokney, A., O. Kobiler, et al. (2008). "Host responses influence on the induction of lambda prophage." *Mol Microbiol* **68**(1): 29-36. <http://www.ncbi.nlm.nih.gov/pubmed/18298445>.
- Sacerdot, C., G. Mercier, et al. (2005). "Impact of ionizing radiation on the life cycle of *Saccharomyces cerevisiae* Ty1 retrotransposon." *Yeast* **22**(6): 441-455. <http://www.ncbi.nlm.nih.gov/pubmed/15849797>.
- Scheinker, V. S., E. R. Lozovskaya, et al. (1990). "A long terminal repeat-containing retrotransposon is mobilized during hybrid dysgenesis in *Drosophila virilis*." *Proc Natl Acad Sci U S A* **87**(24): 9615-9619. <http://www.ncbi.nlm.nih.gov/pubmed/2175908>.
- Schmidt, A. L. and V. Mitter (2004). "Microsatellite mutation directed by an external stimulus." *Mutat Res* **568**(2): 233-243. <http://www.ncbi.nlm.nih.gov/pubmed/15542110>.
- Scholes, D. T., A. E. Kenny, et al. (2003). "Activation of a LTR-retrotransposon by telomere erosion." *Proc Natl Acad Sci U S A* **100**(26): 15736-15741. <http://www.ncbi.nlm.nih.gov/pubmed/14673098>.
- Sehgal, A., C. Y. Lee, et al. (2007). "SREBP controls oxygen-dependent mobilization of retrotransposons in fission yeast." *PLoS Genet* **3**(8): e131. <http://www.ncbi.nlm.nih.gov/pubmed/17696611>.
- Selva, L., D. Viana, et al. (2009). "Killing niche competitors by remote-control bacteriophage induction." *Proc Natl Acad Sci U S A* **106**(4): 1234-1238. <http://www.ncbi.nlm.nih.gov/pubmed/19141630>.
- Servant, G., C. Pennetier, et al. (2008). "Remodeling yeast gene transcription by activating the Ty1 long terminal repeat retrotransposon under severe adenine deficiency." *Mol Cell Biol* **28**(17): 5543-5554. <http://www.ncbi.nlm.nih.gov/pubmed/18591253>.
- Sezutsu, H., E. Nitatsuka, et al. (1995). "Evolution of the LINE-like I element in the *Drosophila melanogaster* species subgroup." *Mol Gen Genet* **249**(2): 168-178. <http://www.ncbi.nlm.nih.gov/pubmed/7500938>.
- Simmons, G. M. (1992). "Horizontal transfer of hobo transposable elements within the *Drosophila melanogaster* species complex: evidence from DNA sequencing." *Mol Biol Evol* **9**(6): 1050-1060. <http://www.ncbi.nlm.nih.gov/pubmed/1331701>.
- Somers, C. M., C. L. Yauk, et al. (2002). "Air pollution induces heritable DNA mutations." *Proc Natl Acad Sci U S A* **99**(25): 15904-15907. <http://www.ncbi.nlm.nih.gov/pubmed/12473746>.
- Spoering, A. L. and M. S. Gilmore (2006). "Quorum sensing and DNA release in bacterial biofilms." *Curr Opin Microbiol* **9**(2): 133-137. <http://www.ncbi.nlm.nih.gov/pubmed/16529982>.
- Stamenova, R., M. Dimitrov, et al. (2008). "Transposition of *Saccharomyces cerevisiae* Ty1 retrotransposon is activated by improper cryopreservation." *Cryobiology* **56**(3): 241-247. <http://www.ncbi.nlm.nih.gov/pubmed/18466893>.
- Stoycheva, T., D. R. Massardo, et al. (2007). "Ty1 transposition induced by carcinogens in *Saccharomyces cerevisiae* yeast depends on mitochondrial function." *Gene* **389**(2): 212-218. <http://www.ncbi.nlm.nih.gov/pubmed/17208390>.
- Stribinskis, V. and K. S. Ramos (2006). "Activation of human long interspersed nuclear element 1 retrotransposition by benzo(a)pyrene, an ubiquitous environmental carcinogen." *Cancer Res* **66**(5): 2616-2620. <http://www.ncbi.nlm.nih.gov/pubmed/16510580>.

- Sturme, M. H., M. Kleerebezem, et al. (2002). "Cell to cell communication by autoinducing peptides in gram-positive bacteria." *Antonie Van Leeuwenhoek* **81**(1-4): 233-243..
- Sugimoto, K., S. Takeda, et al. (2000). "MYB-related transcription factor NtMYB2 induced by wounding and elicitors is a regulator of the tobacco retrotransposon Tto1 and defense-related genes." *Plant Cell* **12**(12): 2511-2528. <http://www.ncbi.nlm.nih.gov/pubmed/11148294>.
- Sutton, M. D., B. T. Smith, et al. (2000). "The SOS response: recent insights into umuDC-dependent mutagenesis and DNA damage tolerance." *Annu Rev Genet* **34**: 479-497. <http://www.ncbi.nlm.nih.gov/pubmed/11092836>.
- Taghavi, S., M. Mergeay, et al. (1997). "Genetic and physical maps of the Alcaligenes eutrophus CH34 megaplasmid pMOL28 and its derivative pMOL50 obtained after temperature-induced mutagenesis and mortality." *Plasmid* **37**(1): 22-34. <http://www.ncbi.nlm.nih.gov/pubmed/9073579>.
- Tahara, E. (2004). "Genetic pathways of two types of gastric cancer." *IARC Sci Publ*(157): 327-349. <http://www.ncbi.nlm.nih.gov/pubmed/15055305>.
- Takahashi, K., Y. Sekine, et al. (2007). "Development of an intermolecular transposition assay system in *Bacillus subtilis* 168 using IS4Bs1 from *Bacillus subtilis* (natto)." *Microbiology* **153**(Pt 8): 2553-2559. <http://www.ncbi.nlm.nih.gov/pubmed/17660419>.
- Todeschini, A. L., A. Morillon, et al. (2005). "Severe adenine starvation activates Ty1 transcription and retrotransposition in *Saccharomyces cerevisiae*." *Mol Cell Biol* **25**(17): 7459-7472. <http://www.ncbi.nlm.nih.gov/pubmed/16107695>.
- Toller, I. M., K. J. Neelsen, et al. (2011). "Carcinogenic bacterial pathogen *Helicobacter pylori* triggers DNA double-strand breaks and a DNA damage response in its host cells." *Proc Natl Acad Sci U S A* **108**(36): 14944-14949. <http://www.ncbi.nlm.nih.gov/pubmed/21896770>.
- Torti, C., L. M. Gomulski, et al. (1997). "Genetic and molecular investigations on the endogenous mobile elements of non-drosophilid fruitflies." *Genetica* **100**(1-3): 119-129. <http://www.ncbi.nlm.nih.gov/pubmed/9440264>.
- True, H. L. and S. L. Lindquist (2000). "A yeast prion provides a mechanism for genetic variation and phenotypic diversity." *Nature* **407**(6803): 477-483. <http://www.ncbi.nlm.nih.gov/pubmed/11028992>.
- Truss, M., G. Chalepkis, et al. (1992). "Interplay of steroid hormone receptors and transcription factors on the mouse mammary tumor virus promoter." *J Steroid Biochem Mol Biol* **43**(5): 365-378. <http://www.ncbi.nlm.nih.gov/pubmed/1327070>.
- Vilarino-Guell, C., A. G. Smith, et al. (2003). "Germline mutation induction at mouse repeat DNA loci by chemical mutagens." *Mutat Res* **526**(1-2): 63-73. <http://www.ncbi.nlm.nih.gov/pubmed/12714184>.
- Waterland, R. A. and R. L. Jirtle (2003). "Transposable elements: targets for early nutritional effects on epigenetic gene regulation." *Mol Cell Biol* **23**(15): 5293-5300. <http://www.ncbi.nlm.nih.gov/pubmed/12861015>.
- Will, W. R., J. Lu, et al. (2004). "The role of H-NS in silencing F transfer gene expression during entry into stationary phase." *Mol Microbiol* **54**(3): 769-782. <http://www.ncbi.nlm.nih.gov/pubmed/15491366>.
- Yannopoulos, G., N. Stamatidis, et al. (1987). "hobo is responsible for the induction of hybrid dysgenesis by strains of *Drosophila melanogaster* bearing the male recombination factor 23.5MRF." *Cell* **49**(4): 487-495. <http://www.ncbi.nlm.nih.gov/pubmed/3032457>.
- Yauk, C., A. Polyzos, et al. (2008). "Germ-line mutations, DNA damage, and global hypermethylation in mice exposed to particulate air pollution in an urban/industrial location." *Proc Natl Acad Sci U S A* **105**(2): 605-610. <http://www.ncbi.nlm.nih.gov/pubmed/18195365>.
- Zahrl, D., A. Wagner, et al. (2007). "GroEL plays a central role in stress-induced negative regulation of bacterial conjugation by promoting proteolytic degradation of the activator protein TraJ." *J Bacteriol* **189**(16): 5885-5894. <http://www.ncbi.nlm.nih.gov/pubmed/17586648>.
- Zelentsova, H., H. Poluectova, et al. (1999). "Distribution and evolution of mobile elements in the virilis species group of *Drosophila*." *Chromosoma* **108**(7): 443-456. <http://www.ncbi.nlm.nih.gov/pubmed/10654083>.

