

**Evolutionary Considerations in Sexual
Reproduction**

More Rotifer Strangeness

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MI615

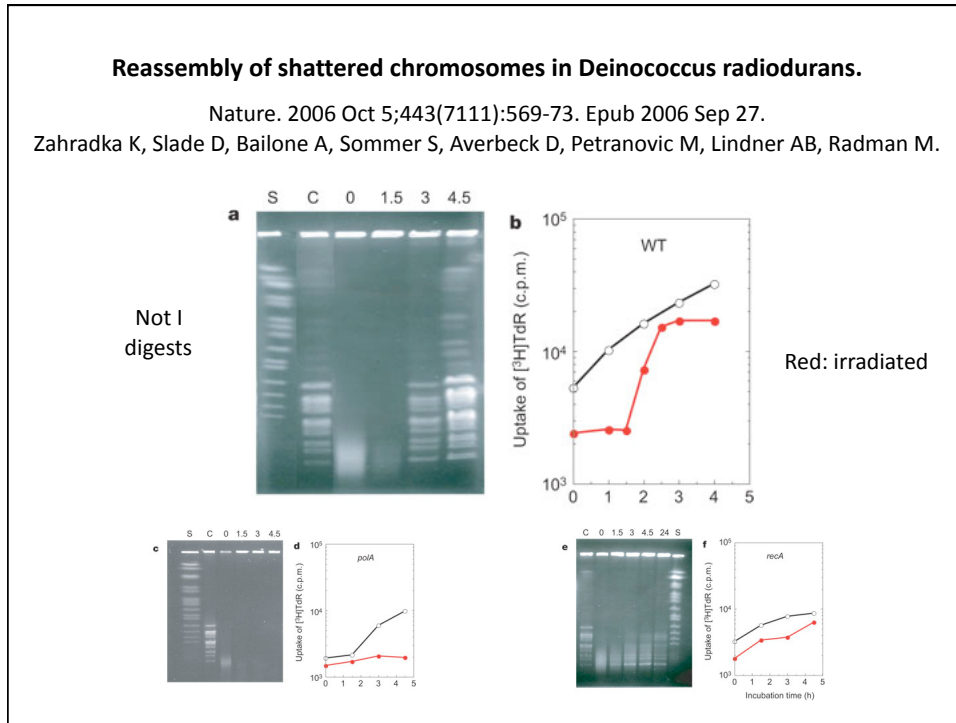
Extreme resistance of bdelloid rotifers to ionizing radiation.

Proc Natl Acad Sci U S A. 2008 Apr 1;105(13):5139-44. Epub 2008 Mar 24.
Gladyshev E, Meselson M.

Reassembly of shattered chromosomes in *Deinococcus radiodurans*.

Nature. 2006 Oct 5;443(7111):569-73. Epub 2006 Sep 27.

Zahradka K, Slade D, Bailone A, Sommer S, Averbek D, Petranovic M, Lindner AB, Radman M.



Fertility: producing at least one active daughter

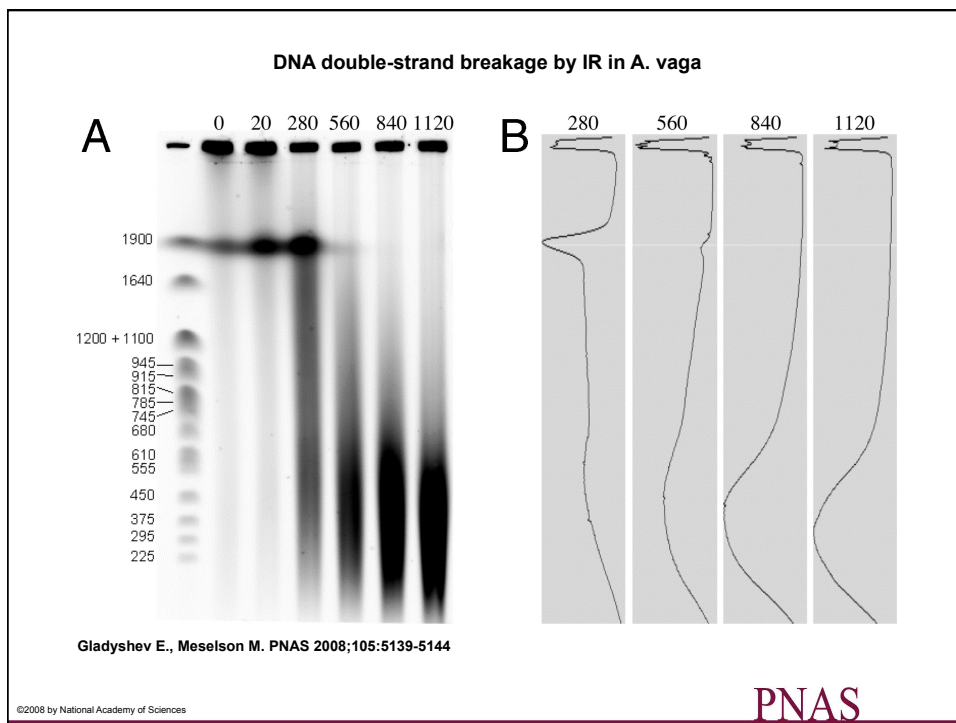
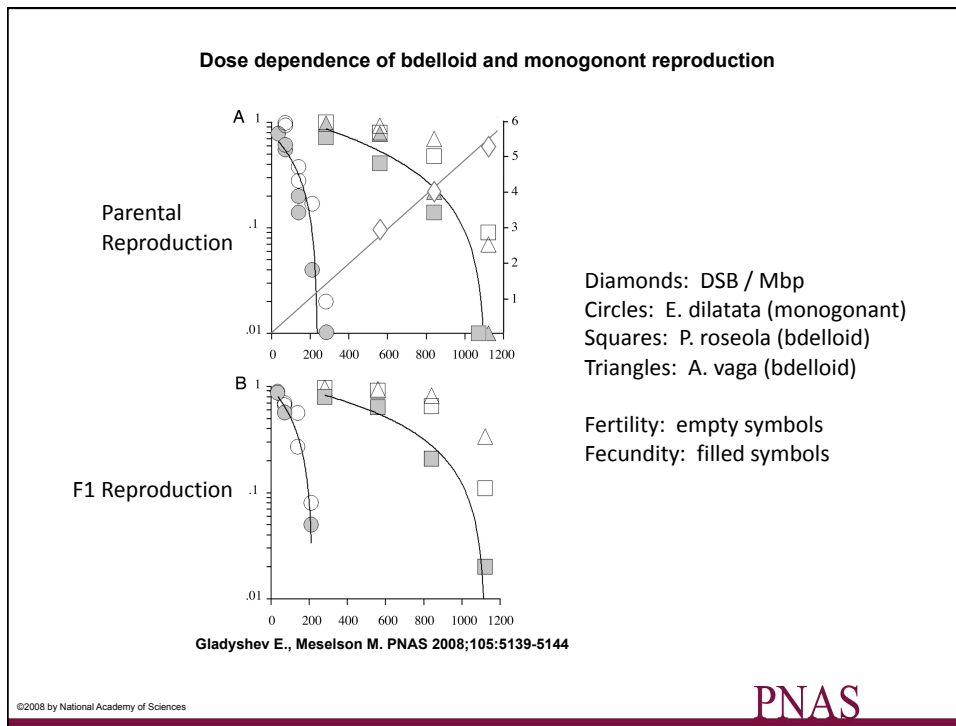
Fecundity: percent hatched eggs

Table 1. Reproductive performance of bdelloid and monogont rotifers exposed to IR

Species	Dose, h	Parental wells				Daughter wells							
		Wells with eggs, n	Wells with F_1 , n	Total eggs, n	Total eggs hatched, n	Relative parental fertility	Relative parental fecundity	Wells with eggs, n	Wells with F_1 , n	Total eggs hatched, n	Relative F_1 fertility	Relative F_1 fecundity	
Monogont	<i>E. dilatata</i>	0	81	68	290	249	1.00	1.00	58	58	1.00	1.00	
		1	82	26	272	35	0.38	0.14	9	6	0.27	0.27	
		2	78	0	266	0	0.00	0.00	n/a	n/a	n/a	n/a	
		3	84	0	278	0	0.00	0.00	n/a	n/a	n/a	n/a	
		0.5	88	86	324	291	1.00	1.00	65	64	1.00	1.00	
		1	87	80	302	160	0.93	0.55	45	40	0.67	0.67	
Bdelloid	<i>E. dilatata</i>	0	88	24	278	58	0.28	0.20	15	10	0.56	0.56	
		2	85	2	316	2	0.02	0.01	1	0	0.00	0.00	
		0	83	83	613	588	1.00	1.00	78	78	1,085	1.00	1.00
		0.25	86	86	577	461	1.04	0.78	74	72	977	0.89	0.87
		0.5	88	82	602	360	0.99	0.61	73	54	612	0.70	0.57
		1.5	82	14	538	24	0.17	0.04	4	1	9	0.08	0.05
Bdelloid	<i>A. vaga</i>	0	89	89	985	866	1.00	1.00	87	87	1.00	1.00	
		2	91	90	1,063	845	1.01	0.98	87	86	0.98	0.98	
		4	88	84	1,240	672	0.94	0.78	80	78	0.95	0.95	
		6	93	62	1,002	187	0.70	0.22	54	50	0.83	0.83	
		8	92	6	1,169	12	0.07	0.01	3	2	0.34	0.34	
		0	95	95	1,914	1,569	1.00	1.00	92	92	2,356	1.00	1.00
Bdelloid	<i>P. roseola</i>	2	96	95	1,956	1,134	1.00	0.72	91	89	1,877	0.97	0.80
		4	93	76	1,873	638	0.80	0.41	73	67	1,201	0.91	0.64
		6	89	46	1,690	217	0.48	0.14	36	29	240	0.65	0.21
		8	89	9	1,711	13	0.09	0.01	3	1	5	0.11	0.02

Rotifers were irradiated on ice for various times with a ^{137}Cs source delivering 140 Gy per h. Parental and F_1 relative fecundity and relative fertility are defined in *Materials and Methods*. The number of daughters transferred to new wells was in each case equal to the number of parental wells in which daughters were produced. For *E. dilatata* the number of hatched eggs was counted directly. For bdelloids it was taken as the number of progeny, as described in *Materials and Methods*.

Dose: 140 Gy / hr



Massive horizontal gene transfer in bdelloid rotifers.

Science. 2008 May 30;320(5880):1210-3.
 Gladyshev EA, Meselson M, Arkhipova IR.

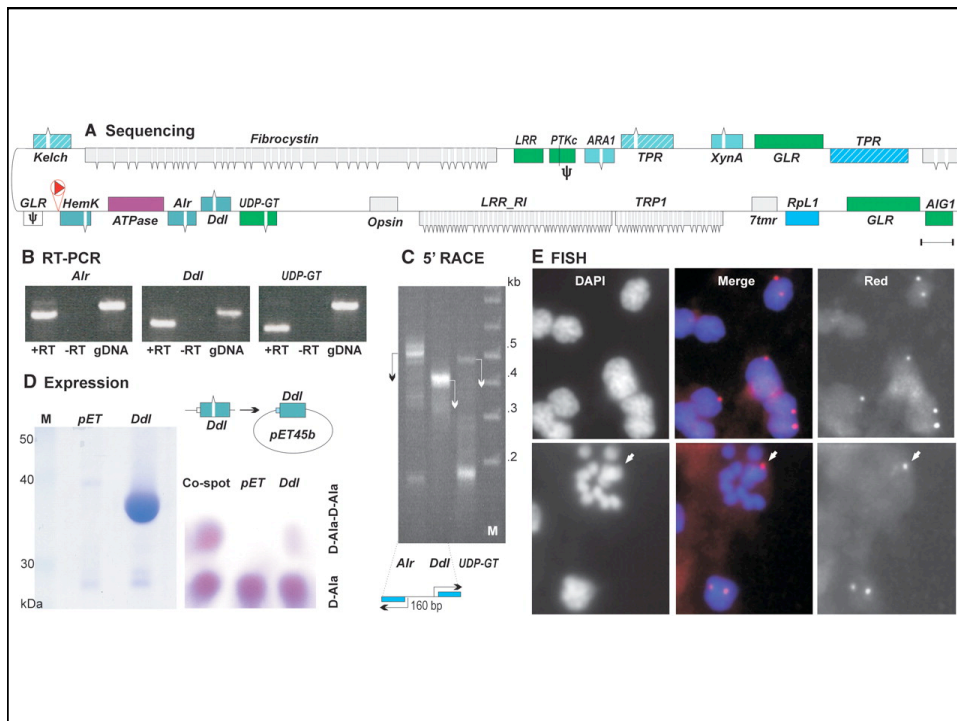


Table 1. Representative bdelloid CDS of foreign origin homologous to genes with known function. For a complete list and additional information on each CDS, see table S1. Data are from BLASTP similarity searches, as described in (19). Asterisks indicate putative pseudogenes.

Gene ID, name	Contig ID	Introns	AI	% Identity to best hit	Best hit, E-value	Best hit, metazoan	Best hit, taxonomy	Definition
AV10027_XynB	Av212A	0	460	63	0.00E+00	No hits	Bacteria; Bacteroidetes	Xylosidase/arabinosidase
AV10001_NRPS	Av110A	10	460	32	0.00E+00	No hits	Bacteria; (Proteobacteria/Cyanobacteria)	Nonribosomal peptide synthetase
AV10134_PheA	161F07	0	400	61	1.00E-174	No hits	(Fungi; Bacteria)	Monooxygenase, FAD dependent
AV10002_TrkA	Av110A	0	379	54	1.00E-175	4.00E-11	Bacteria; Proteobacteria	Monooxygenase, NAD dependent
PR10002_MviM	182F10	0	327	67	1.00E-149	2.00E-07	Bacteria; (Acidobacteria/Chloroflexi)	Oxidoreductase
PR10010_DAP2	182F10	0	310	27	1.00E-140	1.00E-05	Bacteria; (Acidobacteria/Proteobacteria)	Prolyl oligopeptidase*
AV10104_Dur3	AvTelL.B	1	243	44	1.00E-132	4.00E-27	Eukaryota; Fungi	Urea active transporter*
PR10012_RamA	182J17	0	246	31	1.00E-107	No hits	(Bacteria; Fungi)	α -L-Rhamnosidase
AV10121_NRPS	9907	4	237	30	1.00E-103	No hits	Bacteria; Cyanobacteria	Nonribosomal peptide synthetase
AV10153_XghA	210B3	0	212	50	1.00E-108	2.00E-16	Eukaryota; Fungi	Endo-xylogalacturonan hydrolase
AV10042_HemK	Av240B	1	199	56	2.00E-91	1.00E-04	Bacteria; Proteobacteria	HemK-like methyltransferase
AV10092_β-Gal	AvTelL.A	0	153	33	1.00E-105	4.00E-39	Eukaryota; Viridiplantae	β-D-Galactosidase
AV10044_Alr	Av240B	1	152	38	1.00E-67	No hits	Bacteria; Bacteroidetes	Alanine racemase
AV10025_AMH	Av212A	1	150	52	8.00E-77	2.00E-11	Eukaryota; Fungi	Amidohydrolase
AV10045_Ddl	Av240B	1	138	40	1.00E-60	No hits	Bacteria; Bacteroidetes	D-Alanine-D-alanine ligase
AV10140_PLDc	193E18	2	126	31	1.00E-55	No hits	Eukaryota; Fungi	Phospholipase-D active site motif protein*
AV10016_FabG	Av212A	0	98	58	1.00E-74	8.00E-32	Bacteria	Short-chain dehydrogenase/reductase
AV10109_FabG	AvTelL.B	0	92	57	4.00E-73	5.00E-33	Bacteria	Short-chain dehydrogenase/reductase*
AV10011_FabG	Av212A	0	88	54	6.00E-67	2.00E-28	Bacteria	Short-chain dehydrogenase/reductase
AV10071_HAL	AvTelK.A	0	77	48	2.00E-61	1.00E-27	Bacteria	Histidine ammonia-lyase
AV10095_GCNS	AvTelL.A	0	59	35	2.00E-27	No hits	Bacteria; Proteobacteria	GCN5-related N-acetyltransferase ^{2*}
AV10158_FabG	210B3	2	46	41	2.00E-39	2.00E-19	Bacteria	Short-chain dehydrogenase/reductase

