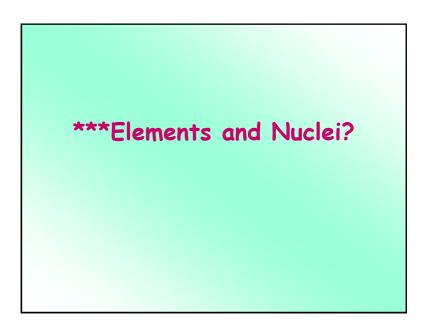
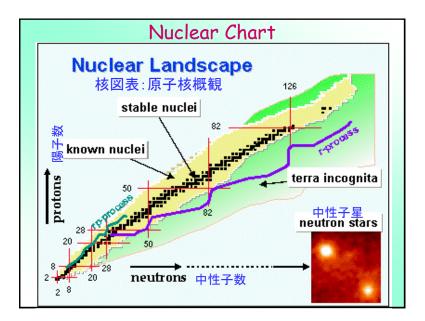
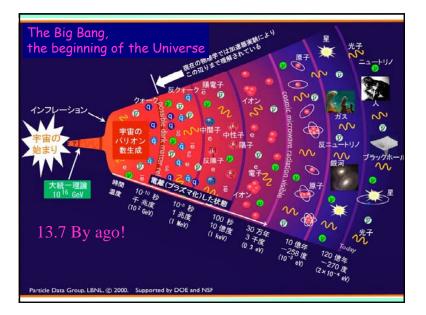


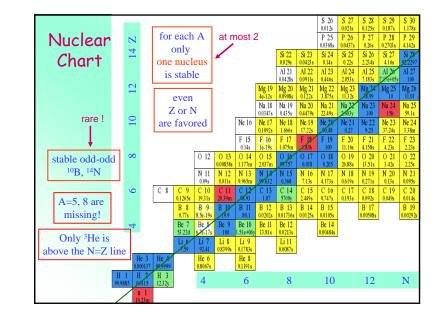
	Elements Necessary for Life																	
主体微量元素																		
1	1.					周		其			表							18 2 1014
2	H 3 1994 Li	4 Kma Be			[		larg	ze a	な常量 mou な微量	nt n の元素	eed		13 5 *2# B	14 ## C	15 7 84 N	16 16	17 9 ∔⇒# F	He 10 40 Ne
3	nina Na	12 trata Mg	3	4	5	6			ん必須 ly_n	である	元素	12	13 781294 Al	14 tron	15 0.4 P	16 1005 S	17 ## CI	18 hr> Ar
4	19 111 K	20 tiota Ca	21 1007 14 SC	22 HD Ti	23 ***/*** V	24 mi Cr	25 1010 Mn	Fe	27 31(3) CO	28 2ms Ni	29 R Cu	30 IIII Zn	Ga	32 Fattas Ge	33 om As	34 to Se	35 AR Br	36 117 10 Kr
5	37 #5754 Rb	38 INDIPA Sr	39 (19554 Y	40 9' 800% Zr	41 37 Nb	42 BTTT MO	43 #14954 TC	44 Artista Ru	45 1734 Rh	46 (1973) Pd	47 ■ Ag	48 55' 104 Cd	49 400'94 In	50 77 Sn	51 17MD Sb	52 744 Te	53 23#	S4 HED Xe
6	55 tina Cs	se rms Ba	57~71 3>9 14 F	72 Atatà Hf	73 1014 Ta	74 107310 W	75 kana Re	76 #1134 Os	77 (1)* 54 Ir	78 n# Pt	79 # Au	80 *# Hg	81 #174 TI	<sup>82</sup> ₩ Pb	83 1770 Bi	84 # 1014 Po	85 73875 At	86 380 Rn
7	87 250294 Fr	88 57 % Ra	89~103 アタチ ノイド	104 107 247 4 Rf	105 1157 214 Db	Sg	107 x -7114 Bh	108 09554 Hs	109 torns Mt	110 (GSI)	111 (GSI)	112 (GSI)	113	114 (JINR)	115	116	117	118
		57~71 5>9 14 F	57 1310 La	58 tita Ce	59 7 965/1 Pr	60 46/1 Nd	61 7 анена Рт	62 77154 Sm	63 3-65' 14 Eu	64 FF1054 Gd	65 587 54 Tb	66 /17 2/31 Dy	67 мата Но	68 38114 Er	69 2954 Tm	70 esta: ta Yb	71 ##54 Lu	
		89~103 アクチ ノイド	89 777574 AC	90 HINA Th	91 7 007791 14 Pa	92 107 U	93 47 3054 Np	94 7.800% Pu	95 7/1254 Am	96 14994 Cm	97 *-##1 Bk	98 1006254 Cf	99 MOLIME TA Es	100 2,4824 Fm	101 107 st 14 Md	102 /	103 8-40094 Lr	
													b	y Y	. Mo	ochi	zuki	

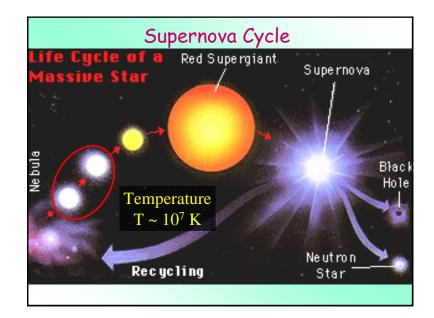


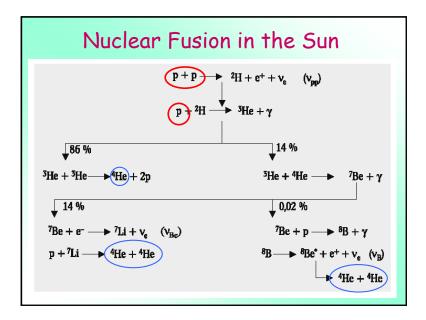


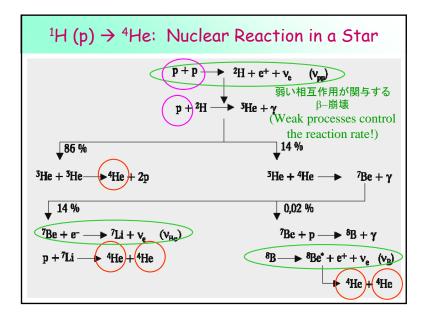


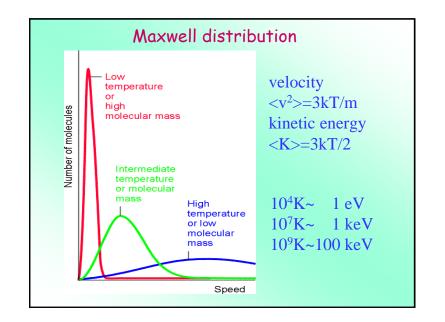
Element Necessary for Life																		
生体微量元素																		
1 1	H	2				周		其		の元素	表		13	14	15	16	17	18 **** He
2	1 2 1994 - 1994 2 1994 - 1994 Li Be												5 *2# B	6 RA C	N N	10 0	9 ***# F	10 HD Ne
3	Na	12 triota Mg	3	4	5	6	: E FI	こたぶ。 8	9	10	11	12	13 781294 Al	14 UOR Si	15 V.4 P	16 1985 S	17 ## CI	18 hr> Ar
4	19 111 K	20 tions Ca	21 1007 16 SC	22 Ho Ti	23 ***/*** V	24 mi Cr	25 1070 Mn	Fe	27 31' 84 Co	28 orts Ni	29 EU	30 20 Zn	Ga	32 * stens Ge	33 Data As	34 to Se	as Br	36 нт ю Кг
5	37 ACVSA Rb	38 ANDERA Sr	39 (19554 Y	40 V ADDA Zr	41 37 Nb	42 BUTTO MO	43 894954 TC	44 Afrita Ru	45 1/34 Rh	46 * 35 34 Pd	47 ■ Ag	48 31 <sup>°</sup> 114 Cd	49 69'94 In	50 FF Sn	51 DHD Sb	Te	53 208	s4 HUD Xe
6	55 tML CS	se ⊮ms Ba	57~71 3>9 /4F	72 Althá Hf	73 1014 Ta	74 97390 W	Re	76 #1154 OS	77 (157.14 Ir	78 n# Pt	79 # Au	<sup>80</sup> ₩ Hg	81 //74 TI	<sup>82</sup> ■ Pb	83 6'203 Bi	84 Final PO	At	86 ⊮⊃ Rn
7	87 250054 Fr	88 97 % Ra	89~103 797 74F	no4 M AF	105 Fetrana Db	Sg	107 x -7154 Bh	108 hypean HS	Mt	110 (GSI)	111 (GSI)	112 (GSI)	113	114 (JINR)	115	116	117	118
		57~71 3>9 14F	57 1340 La	58 8154 Ce	59 7 965'1 Pr	60 4074 Nd	61 7 анты Рт	62 17134 Sm	63 3-80114 Eu	64 514 1014 Gd	65 лк'ла Тb	66 10 8/31 Dy	67 мать Но	68 38194 Er	69 2954 Tm	70 (star ta Yb	71 #754 Lu	
		89~103 709 J4F	89 701011 AC	90 HINA Th	91 7 00 771 14 Pa	92 110 U	93 17 70% Np	94 7.49594 Pu	95 74124 Am	96 14114 Cm	97 **-11111 Bk	98 1006254 Cf	99 MOANG 14 Es	100 20834 Fm	101 of it's Md	102 (~~)% NO	103 0-40094 Lr	
													b	уY.	Mo	ochi	zuki	

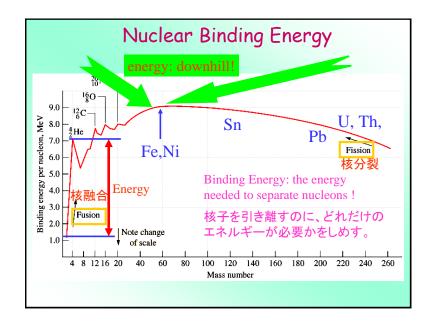


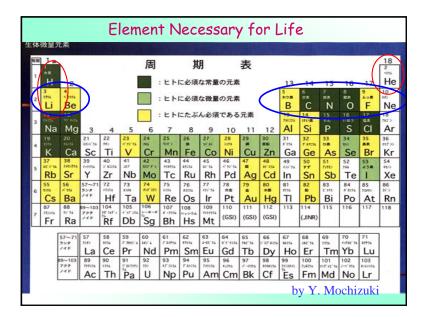


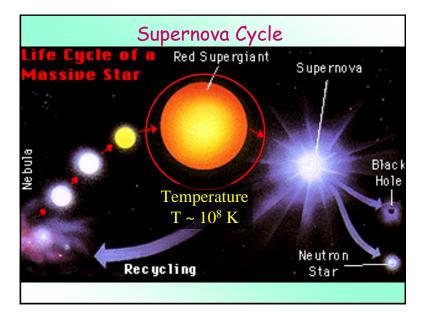


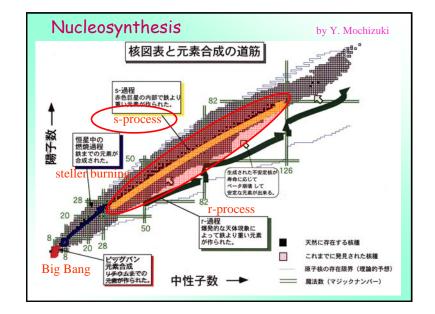


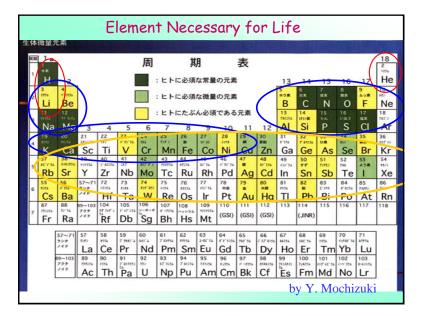


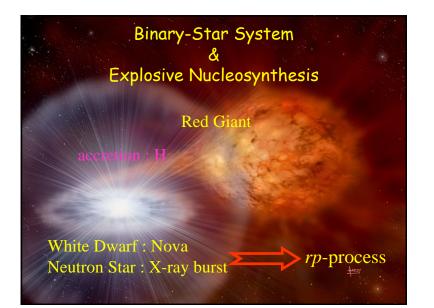


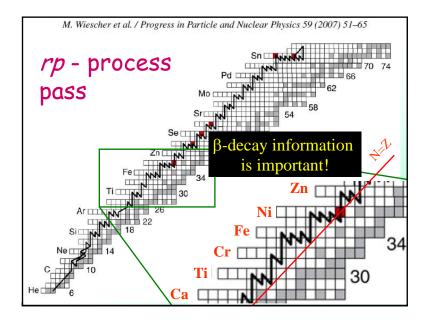


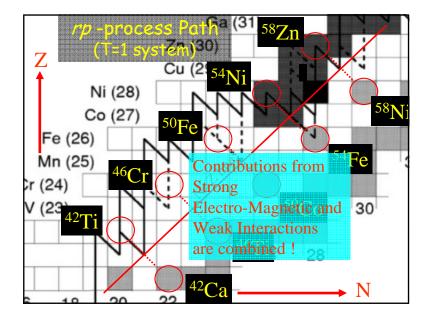


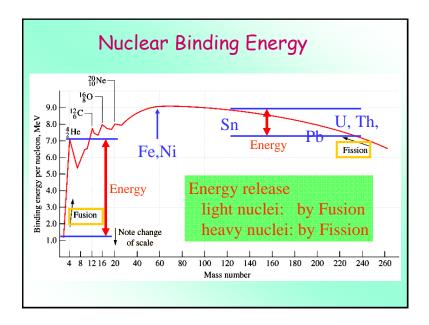


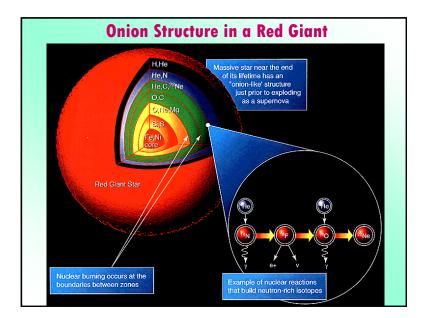


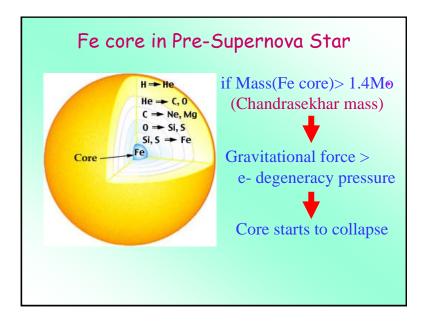


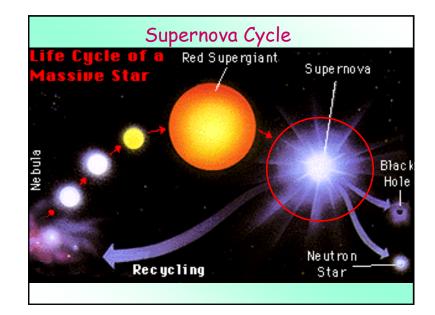




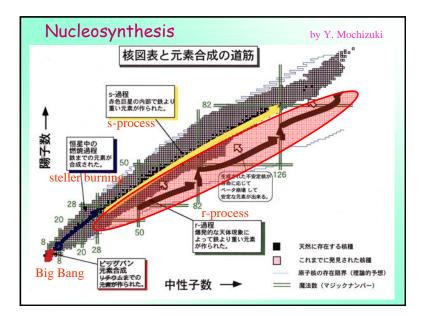


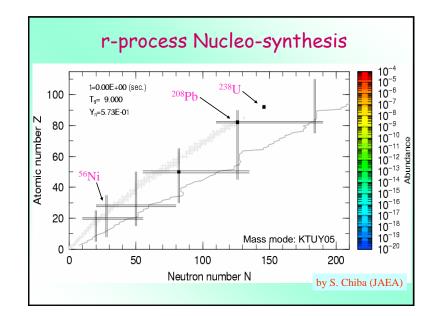




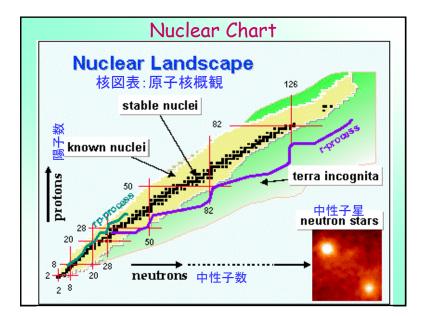


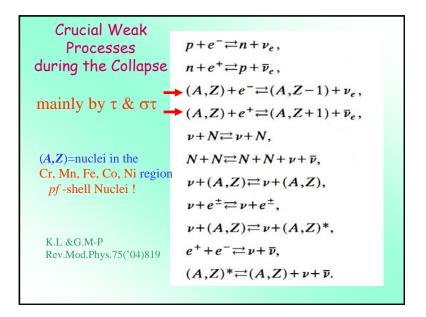
Evolutio	onary Stages f	or 25 Solar	Mass Star
Stage	Temperature (K)	Density (g/cm <sup>3</sup> )	Duration
Hydrogen Burning	4×107	5	7 × 10 <sup>6</sup> yrs
Helium Burning	2×10 <sup>8</sup>	700	5 × 10 <sup>5</sup> yrs
Carbon Burning	6×108	2×10 <sup>5</sup>	600 yrs
Neon Burning	1.2×109	4×10 <sup>6</sup>	1 yr
Oxygen Burning	1.5×109	107	6 months
Silicon Burning	2.7×109	3×107	1 day
Core Collapse	5.4×109	3×10 <sup>9</sup>	1/4 sec
Core Bounce	2.3×10 <sup>10</sup>	4×1014	milliseconds



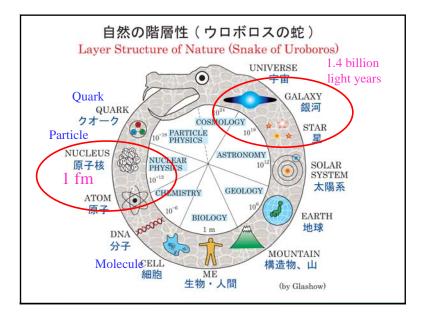


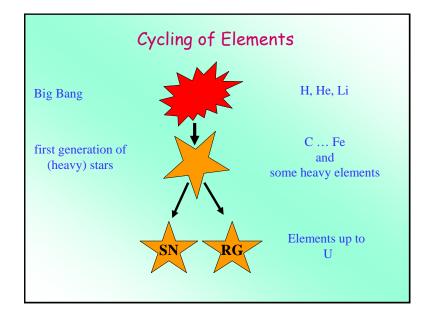


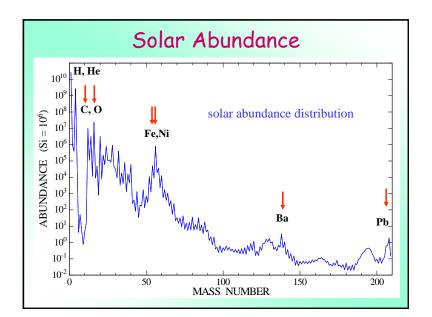


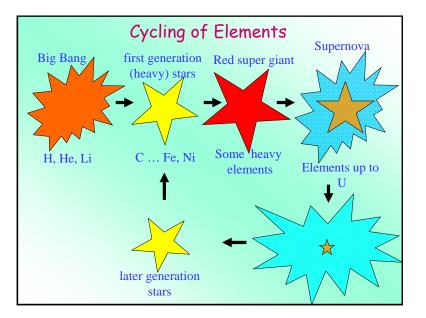


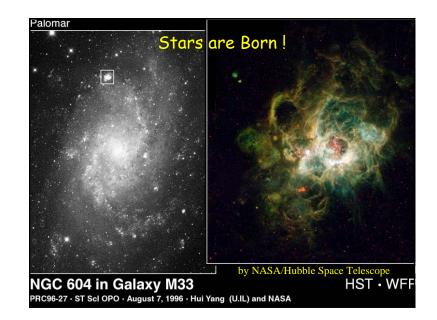












Elements Necessary for Life																		
生体	微量:	元乘		i de la								4				1.56		
1.10	11 8					周		其	月		表							18
1	H	z							な常量				13	14	15	16	17	He
2	3 1994 Li	4 ≺ma Be			Ī				mou な微量 moi	の元素			5 *?# B	ERA C	7 8.8 N	in the second se	9 ***# F	10 40 Ne
3	11 Initia Na	12 tritera Mg	3	4	5	6	small amount needed : ヒトにたぶん必須である元素 probably needed 6 アンローロー11 12							14 tron	15 0.4 P	16 1985 S	17 ## CI	18 hr> Ar
4	19 1111 K	20 tiona Ca	21 100'54 SC	22 Ho Ti	23 ***/*** V	24 ms Cr	25 tar> Mn	Fe	27 31'84 Co	28 2ms Ni	29 R Cu	<sup>30</sup> ■■ Zn	31 Fina Ga	32 Y AUM Ge	33 om As	34 tov Se	35 AR Br	36 HT IN Kr
5	37 ACV SA	38 aleofta Sr	39 (19554 Y	40 9' 800% Zr	41 27 Nb	42 B777 MO	43 #14994 TC	44 AFESA Ru	45 1734 Rh	46 6 35 34 Pd	47 ■ Ag	48 55' 104 Cd	49 497.54 In	50 77 Sn	51 DHD Sb	52 746 Te	53 238	S4 HED Xe
6	55 tina Cs	56 6 114 Ba	57~71 3>9 14 F	72 Altala Hf	73 1015 Ta	74 807389 W	75 Penk Re	76 #1134 Os	77 (107 %) Ir	78 n# Pt	79 # Au	80 *# Hg	81 //74 TI	82 10 Pb	83 6' ana Bi	84 # 1014 Po	85 Taito At	86 910 Rn
7	87 250254 Fr	88 50'54 Ra	89~103 797 /4F	104 11 245'4 Rf	105 F 17 214 Db	Sg	107 r -7114 Bh	108 072234 Hs	109 norm Mt	110 (GSI)	111 (GSI)	112 (GSI)	113	114 (JINR)	115	116	117	118
		57~71 7>9 /4F	57 130 La	58 tita Ce	59 7 985/1 Pr	60 45/1 Nd	61 7 анна Рт	62 171134 Sm	63 3-65' 14 Eu	64 1 F Tabl	65 58154 Tb	66 7 17 2191 DV	67 вала Но	68 38114 Er	69 2954 Tm	70 (street tak Yb	71 47754 Lu	
		89~103 705 J4F	89 Mina AC	90 HINA Th	91 7 0+779: 14 Pa	92 110 U	93 17 7054 Np	94 7.49594 Pu	95 77724 Am	96 1.1112 Cm	97 **-11114	98 1004254 Cf	99 101411 Es	100 214324 Fm	101 107 H 14	102 /	103 0-40994 Lr	-
													b	y Y	Mo	ochi	zuki	

