Filed Pursuant to Rule 424(b)(3) and (c) File No. 333-106942

## Prospectus Supplement No. 7 Dated August 20, 2004 To Prospectus Dated July 23, 2003

Rigel Pharmaceuticals, Inc. 9,583,331 Shares Common Stock

This prospectus supplement supplements the prospectus, dated July 23, 2003, of Rigel Pharmaceuticals, Inc. relating to the offering and sale by selling stockholders of Rigel (or by donees, pledgees, transferees and other successors in interest that receive such shares as a gift, pledge, partnership distribution or other non-sale transfer) of 9,583,331 shares of our common stock. This prospectus supplement should be read in conjunction with the prospectus, and is qualified by reference to the prospectus, except to the extent that the information presented herein supercedes the information contained in the prospectus. The term "Selling Stockholders" as used in the prospectus shall be deemed to include the selling stockholders identified in the table below. This prospectus supplement is not complete without, and may not be delivered or utilized except in connection with, the prospectus, including any amendments or supplements thereto.

## Investing in our securities involves a high degree of risk. See "Risk Factors" beginning on page 1 of the prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

This prospectus supplement is being filed in connection with the distribution of shares held by Alta California Partners, L.P., Alta Embarcadero Partners, LLC, Alta BioPharma Partners II, L.C. (collectively, the "Alta Funds"), each identified in the prospectus as a selling stockholder, to their partners and members. No additional shares of Rigel common stock are being offered for resale hereunder. Except with respect to directors and officers of Rigel, the Alta Funds and entities that have filed reports pursuant to Section 13(f) of the Securities Exchange Act of 1934, as amended (the "Act"), and statements of beneficial ownership filed pursuant to Sections 13(d) and 13(g) of the Act, the ownership indicated in the table below is based solely on shares owned by the indicated selling stockholders as a result of distributions of shares by the Alta Funds. The table appearing on pages 16 and 17 of the prospectus under the caption "Selling

Stockholders" is supplemented and amended to include the following stockholders in addition to those identified in the prospectus:

Name and Address of Owner***	Ownership Before Offerin	Ownership Before Offering		Ownership After Offering	
	Shares	Percent*	Shares = Offered	Shares	
Alta California Partners, L.P.(1) One Embarcadero Center, Suite 4050 San Francisco, CA 94111	33,947	**	33,947	0	
Alta Embarcadero Partners, LLC(1) Dne Embarcadero Center, Suite 4050 San Francisco, CA 94111	776	**	776	0	
Alta BioPharma Partners II, L.P.(1) Dne Embarcadero Center, Suite 4050 San Francisco, CA 94111	1,025,470	5.6%	1,025,470	0	
Alta Embarcadero BioPharma Partners II, LLC(1) Dne Embarcadero Center, Suite 4050 San Francisco, CA 94111	37,723	**	37,723	0	
999 Farah Hyder Champsi Trust	1,998	**	1,388	610	
Anne Davis Living Trust Dtd 1/22/04	7,359	**	1,871	5,488	
A. Rachel Leheny	380	**	264	116	
lison de Bord	492	**	342	150	
Indreas Bremer	286	**	198	88	
rnold T Hagler Separate Property Trust dtd 9/17/97	142	**	99	43	
Arun K. Aggarwal	47	**	33	14	
SF Montparnasse Limited	10,938	**	2,782	8,156	
B.A. Ventures, Inc.	572	**	278	294	
Bank of America Capital Corporation	14,250	**	9,902	4,348	
Bear Stearns Securities (Custodians) for Douglas I. Lovison	219	**	56	163	
lackboard Ventures, Inc.	38,000	**	26,405	11,595	
Boatmen's Trust F/B/O Laura Hoblitzelle	437	**	111	326	
trian E. Cobb	510	**	234	276	
rian W. McNeill	296	**	117	179	
3SD & T of CA As Agent For 1051-0032-006	437	**	111	326	
SD & T of CA As Trustee For 1051-0005-002	437	**	111	326	
Burr Family Investment Company, LLC	3,680	**	936	2,744	
alifornia Public Employees' Retirement System	397,785(2)	1.9%	141,433	256,352(2)	
hase Capital Partners Private Equity Fund of Funds	19,000	**	13,202	5,798	
Christopher Walsh	95	**	66	29	
ZINQ-M Participations	475	**	330	145	

Claudio Engel	380	**	264	116
Comerica Capital Advisors	950	**	660	290
Continental Investments Corporation, LLC	2,044	**	938	1,106
Craig L. Burr 1985 Children's Trust	1,146	**	501	645
Craig L. Burr Revocable Trust	671	**	171	500
Daniel Fred Goodman	190	**	132	58
Daniel H. Case Separate Property Non-Exempt Marital Trust	475	**	330	145
Daniel Janney and Noelle Montgomery Family Trust	4,084	**	1,217	2,867
Daniel Richner	190	**	132	58
Daniel V. Santi	95	**	66	29
David E. Retick Trust	27	**	7	20
Deleage Children's Trust FBO Andre Deleage	2,329	**	660	1,669
Deleage Children's Trust FBO Emmanuel Deleage	2,329	**	660	1,669
Deleage Children's Trust FBO Michel Deleage	2,329	**	660	1,669
Deleage Children's Trust FBO Phillippe Deleage	2,329	**	660	1,669
Des femmes Foundation, Inc.	475	**	330	145
Dolly Champsi	475	**	330	145
Edward E. Penhoet	3,181	**	2,210	971
Edward Hurwitz	76	**	53	23
Eileen McCarthy	1,947	**	513	1,434
Elliot B. & Pascale V. Evers Revocable Trust	832	**	337	495
Eric W. Roberts	475	**	330	145
Eugene G. Chen	47	**	33	14
Eurazeo	28,500	**	19,804	8,696
Finedix, B.V.	4,750	**	3,301	1,449
Fleet National Bank & Edith N.K. Meyer Trustees U/I C.P. Knight, Jr. Residuary Trust DTD 12/19/61 as Amended	547	**	139	408
Francois A. L'Eplattenier	190	**	132	58
Fred S. Endsley, as Trustee of General Fund c/u/a Dtd August 10, 1987	437	**	111	326
Garden Bay Investors	190	**	132	58
Garrett P. Gruener	15,865	**	4,421	11,444
GC&H Investments	1,306	**	499	807
Geoffrey R. Hoguet	201	**	51	150

Guy Paul Nohra and Linda Nohra, Nohra Living Trust	11,442	**	3,087	8,355
H. Michael Cohen	95	**	66	29
Hans Tjian	95	**	66	29
Harris Barton	475	**	330	145
Health Partners Holdings Limited	1,900	**	1,320	580
Hilary Strain	202	**	140	62
Hoblitzelle FBO Christopher Augur	146	**	37	109
Hoblitzelle FBO Harrison H. Augur	145	**	37	108
Hoblitzelle FBO Newell A. Augur Jr.	146	**	37	109
Howard Hughes Medical Institute	28,500	**	19,804	8,696
James Cervantes	95	**	66	29
James M. Gower(3)	125,628	**	264	125,364
Jean Deleage(4)	9,593	**	2,832	6,761
Jean-Philippe Tripe	190	**	132	58
John Clawson	95	**	66	29
JP Morgan Chase Bank as Trustee of the Corning Inc. Retirement Master Trust	9,500	**	6,601	2,899
Kenneth E. Williams	95	**	66	29
Khaled Nasr	101	**	70	31
Kingsley Profit Sharing Trust	67	**	17	50
KJM Florida Trust	475	**	330	145
Le Serre	173	**	76	97
Len R. Small	285	**	198	87
Lip-Bu Tan & Ysa Loo, TTES FBO Lip-Bu Tan & Ysa Loo Trust UTD 2/3/92	285	**	198	87
Lockard/Marduel Revocable Trust	1,903	**	1,322	581
Lotus BioScience Investment Holdings Ltd	19,000	**	13,202	5,798
Lushtak Family Living Trust DTD 8/9/99	475	**	330	145
Mahendra G. Shah	95	**	66	29
Marc L. Abramowitz	475	**	330	145
Marina Bozilenko	475	**	330	145
Mario M. Rosati, Trustee of the Mario M. Rosati Trust U/D/T 1/5/90	142	**	99	43
Mark J. and Becky R. Levin	475	**	330	145
Mellon Bank As Agent For 1026-032245-8	547	**	139	408
Mellon Bank As Agent For 1026-032279-7	547	**	139	408

Mellon Bank As Agent For 1083-671500-0	437	**	111	326
Mellon Bank As Agent For 1083-67D200-7	437	**	111	326
Mellon Bank As Agent For 1083-671600-0	874	**	222	652
Mellon Bank As Agent For 1084-28YW01-6	219	**	56	163
Mellon Bank As Agent For 1084-316H01-4	547	**	139	408
Mellon Bank As Agent For 1084-33VX00-0	437	**	111	326
Mellon Bank As Trustee For 1026-018408-0	1,094	**	278	816
Mellon Bank As Trustee For 1026-019556-5	1,094	**	278	816
Mellon Bank As Trustee For 1026-460574-2	437	**	111	326
Mellon Bank As Trustee For 1026-460581-7	437	**	111	326
Mellon Bank As Trustee For 1026-540503-5	656	**	167	489
Mellon Bank As Trustee For 1084-09FN42-1	2,187	**	556	1,631
Vellon Bank As Trustee For 1084-09FN46-0	547	**	139	408
Aellon Bank As Trustee For 1051-067700-0	437	**	111	326
Iellon Bank NA As Agent For Account 1026-020287-0	2,187	**	556	1,631
Aellon Bank NA As Agent For Account 1026-402383-0	2,187	**	556	1,631
Vellon Bank NA As Agent For Account 1026-047161-0	19,000	**	13,202	5,798
Aellon Bank NA As Custodian For Account 1026-071459-0	437	**	111	326
Jichael G. Dovey Individual Account	95	**	66	29
Mitchell H. Gage	190	**	132	58
Jumtaz H. Champsi	380	**	264	116
Jeedham & Company, Inc.	1,094	**	278	816
Viel H. Sherman	76	**	53	23
Jorth Star Venture Mgmt Inc. Pst F/B/O Terrance Mcguire	134	**	34	100
Northern Trust Bank of Florida A/C 22316700, Fred Endsley Insurance Trust Itd 6/27/78, Fred Endsley Trustee	437	**	111	326
Nottingham Trust	107	**	27	80
Id Westbury Venture Capital Fund, L.L.C.	26,195	**	6,661	19,534
		at at	167	489
Peter S. Handy	656	**	107	489
	656 3,800	**	2,641	1,159
Peter S. Handy Peter Seeburg PH Investments, LLC				

R. Scott Greer	950	**	660	290
Raijacur, N.V.	5,700	**	3,961	1,739
Rainicur, N.V.	5,700	**	3,961	1,739
Revocable Trust of Gerald M. Rubin	475	**	330	145
Robert Simon	101	**	70	31
RockPoint Capital II	9,500	**	6,601	2,899
Sanford Robertson & Jeanne Robertson, Trustees of the Robertson Revocable Trust dated 11/27/02	475	**	330	145
Scaler Foundation	1,425	**	990	435
Scott C. Sollers	152	**	106	46
Silicon Valley Bancshares	547	**	139	408
Soparexo	5,700	**	3,961	1,739
Stephanie Lovison Trust dtd 10/3/01, Stephanie Lovison Trustee	219	**	56	163
Sutro Investment Partners VI, LLC	950	**	660	290
Swan Ventures, L.P.	1,900	**	1,320	580
Taha Tippu Hyder Champsi	190	**	132	58
Tandon Family Trust	2,187	**	556	1,631
Teachers Insurance and Annuity Association of America	38,000	**	26,405	11,595
The Clarence Westbury Foundation	570	**	396	174
The McGuire Family Irrevocable Trust	190	**	132	58
The Nohra 1996 Credit Trust U/A/D 12/2/96	3,680	**	936	2,744
The Sutro Group	1,094	**	278	816
Theodore A. Bosler Trust U/A 4/21/93	328	**	83	245
Thomas B. King	190	**	132	58
Thomas J. Dietz	190	**	132	58
Thuban Partners L.P.	142	**	99	43
Timothy L. Dibble	80	**	20	60
Timothy P. Neher	547	**	139	408
Virginia M. Turezyn	190	**	132	58
Waldemar Jantz	475	**	330	145
Warren E. Miller and Britt Marie E. Ljung Living Trust dtd 6/20	95	**	66	29
Wells Fargo Bank Minnesota NA & Frank Polestra Co-Executors for Marino Polestra Estate	7,417	**	1,897	5,520

Total	1,877,149	10.5%	1,480,549	396,600	
WS Investment Company, LLC (2000B)	190	**	132	58	
WS Investment Company, LLC (2000)	142	**	99	43	
WS Investment Company 96A	201	**	51	150	
William Thomas Lockard, Trustee and Alix Marduel, Trustee—Lockard/Marduel Revocable Trust	475	**	330	145	
William P. Egan 1985 Childrens Trust F/B/O William P. Egan III	287	**	126	161	
William P. Egan 1985 Childrens Trust F/B/O Mark P. Egan	287	**	126	161	
William P. Egan 1985 Childrens Trust F/B/O Kristen E. Reed	287	**	126	161	
William P. Egan 1985 Childrens Trust F/B/O Gregory J. Egan	287	**	126	161	
William P. Egan	671	**	171	500	
William J. Steding	219	**	56	163	

\* Percentage calculations based on 18,454,166 shares of our common stock that were issued and outstanding as of August 17, 2004.

- (1) Includes 33,947 shares of common stock that are subject to purchase by Alta California Partners, L.P., 776 shares of common stock that are subject to purchase by Alta Embarcadero Partners, LLC, 217,686 shares of common stock that are subject to purchase by Alta BioPharma Partners II, L.P. and 8,008 shares of common stock that are subject to purchase by Alta Embarcadero BioPharma Partners II, LLC under warrants that are currently exercisable. Jean Deleage, PhD, a director of Rigel since 1997, is a principal of Alta Partners and a general partner, managing director, manager or member of the foregoing funds. As a general partner, managing director, manager or member of the foregoing funds, Dr. Deleage may be deemed to share voting and investment powers for the shares held by the foregoing funds. Dr. Deleage disclaims beneficial ownership of the shares held by funds affiliated with Alta Partners except to the extent of his proportionate pecuniary interest therein.
- (2) Includes 55,545 shares of common stock as disclosed on a Form 13F for the quarter ended June 30, 2004.

(3) Includes 125,248 shares of common stock previously owned by Mr. Gower. Mr. Gower is the Chairman of the Board and Chief Executive Officer of Rigel.

(4) Dr. Deleage is a director of Rigel.

<sup>\*\*</sup> Less than 1%

<sup>\*\*\*</sup> Addresses that are not listed are c/o Alta Partners, One Embarcadero Center, Suite 4050, San Francisco, CA 94111.

## QuickLinks

Filed Pursuant to Rule 424(b)(3) and (c) File No. 333-106942

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