

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT4086537

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT

**CONVEYING PARTY DATA**

Name	Execution Date
PRONUTRIA BIOSCIENCES, INC.	07/28/2016

**RECEIVING PARTY DATA**

<b>Name:</b>	AXCELLA HEALTH INC.
<b>Street Address:</b>	840 MEMORIAL DRIVE, 3RD FLOOR
<b>City:</b>	CAMBRIDGE
<b>State/Country:</b>	MASSACHUSETTS
<b>Postal Code:</b>	02139

**PROPERTY NUMBERS Total: 105**

Property Type	Number
Application Number:	14374127
Application Number:	13837004
Application Number:	13836977
Application Number:	13836934
Application Number:	13836898
Application Number:	13836810
Application Number:	62038766
Application Number:	62055480
Application Number:	62055486
Application Number:	62055426
Application Number:	62101879
Application Number:	61807433
Application Number:	61737896
Application Number:	61749450
Application Number:	61615791
Application Number:	61615816
Application Number:	61615819
Application Number:	61615823
Application Number:	61615829
Application Number:	61639673

PATENT

<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	61639691
<b>Application Number:</b>	61639680
<b>Application Number:</b>	61728427
<b>Application Number:</b>	61728685
<b>Application Number:</b>	61727635
<b>Application Number:</b>	61727646
<b>Application Number:</b>	61769429
<b>Application Number:</b>	61769444
<b>Application Number:</b>	61808650
<b>Application Number:</b>	61615824
<b>Application Number:</b>	61583068
<b>Application Number:</b>	61570774
<b>Application Number:</b>	61882211
<b>Application Number:</b>	61882214
<b>Application Number:</b>	61882219
<b>Application Number:</b>	61882220
<b>Application Number:</b>	61882225
<b>Application Number:</b>	61882229
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<b>Application Number:</b>	61882068

<b>Property Type</b>	<b>Number</b>
Application Number:	61882069
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Application Number:	61882072
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Application Number:	61882029
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Application Number:	14335071
Application Number:	14337563
Application Number:	14387675
Application Number:	14387677

Property Type	Number
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Application Number:	14387684
Application Number:	15024636
Application Number:	15024639
Application Number:	15024641
Application Number:	15024644
Application Number:	15024648
Application Number:	62207040
Application Number:	15081004

**CORRESPONDENCE DATA**

**Fax Number:** (650)938-5200

*Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.*

**Phone:** 415-875-2352

**Email:** sfuentes@fenwick.com

**Correspondent Name:** KEVIN KABLER

**Address Line 1:** 801 CALIFORNIA STREET

**Address Line 4:** MOUNTAIN VIEW, CALIFORNIA 94041

**ATTORNEY DOCKET NUMBER:** 28411-01000

**NAME OF SUBMITTER:** KEVIN KABLER, REG. NO. 63090

**SIGNATURE:** /Kevin Kabler/

**DATE SIGNED:** 10/06/2016

**Total Attachments: 36**

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## ASSIGNMENT

For good and valuable consideration, the receipt of which is hereby acknowledged, Pronutria Biosciences, Inc., a Delaware corporation, having a place of business at 840 Memorial Drive, 3<sup>rd</sup> Floor, Cambridge, MA 02139 ("ASSIGNOR"), has sold, assigned, and transferred and does hereby sell, assign, and transfer to Axcella Health Inc., a Delaware corporation, having a place of business at 840 Memorial Drive, 3<sup>rd</sup> Floor, Cambridge, MA 02139 ("ASSIGNEE"), for itself and its successors, transferees, and assignees, the following:

1. The entire worldwide right, title, and interest in all inventions and improvements ("SUBJECT MATTER") that are disclosed in the following provisional or non-provisional application filed under 35 U.S.C. § 111, design application filed under 35 U.S.C. § 171, international application filed according to the Patent Cooperation Treaty (PCT), U.S. national phase application filed under 35 U.S.C. § 371, and any patents issuing thereon ("PATENT RIGHTS"):

### \*LISTED IN APPENDIX A\*


and;

2. The entire worldwide right, title, and interest in and to:  
(a) the PATENT RIGHTS, including any right of priority; (b) any provisional, divisional, continuation, substitute, renewal, reissue, and other related applications thereto which have been or may be filed in the United States or elsewhere in the world; (c) any patents which may be granted on the applications set forth in (a) and (b) above; and (d) the right to sue in its own name and to recover for past infringement of any or all of any applications or patents issuing therefrom together with all rights to recover damages for infringement of provisional rights.

ASSIGNOR agrees to do the following, when requested, and without further consideration, in order to carry out the intent of this Assignment: (1) execute all oaths, assignments, powers of attorney, applications, and other papers necessary or desirable to fully secure to ASSIGNEE the rights, titles and interests herein conveyed; (2) communicate to ASSIGNEE all known facts relating to the SUBJECT MATTER of the above-identified patent applications and Letters Patents; and (3) generally do all lawful acts that ASSIGNEE shall consider desirable for securing, maintaining, and enforcing worldwide patent protection relating to the SUBJECT MATTER of the above-identified patent applications and Letters Patents and for vesting in ASSIGNEE the rights, titles, and interests herein conveyed. ASSIGNOR further agrees to provide any successor, transferee, assignee, or legal representative of ASSIGNEE with the benefits and assistance provided to ASSIGNEE hereunder.

ASSIGNOR represents that ASSIGNOR has the rights, titles, and interests to convey as set forth herein, and covenants with ASSIGNEE that the ASSIGNOR has made or will make hereafter no assignment, grant, mortgage, license, or other agreement affecting the rights, titles, and interests herein conveyed.

Duly Authorized Representative of ASSIGNOR



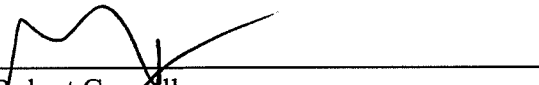
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Robert Connelly  
President & Chief Executive Officer  
Pronutria Biosciences, Inc.

Date of Signature

July 28th, 2016

Duly Authorized Representative of ASSIGNEE



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Robert Connelly  
President & Chief Executive Officer  
Axcella Health Inc.

Date of Signature

July 28th, 2016

## APPENDIX A

FILE NUMBER	TITLE	CLIENT REF.	DATE FILED	APPLICATION NUMBER	INVENTORS	STATUS
28411-23857/US	Nutritive Fragments, Proteins and Methods	ESS-016.US0	Mar 15, 2013	13837004	Nathaniel W. Silver, David Arthur Berry, Rajeev Chillakuru, Geoffrey von Maltzahn	Abandoned
28411-23858/US	Nutritive Fragments and Proteins with Low or No Phenylalanine and Methods	ESS-011.US0	Mar 15, 2013	13836977	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn	Abandoned
28411-23859/US	Charged Nutritive Fragments, Proteins and Methods	ESS-009.US0	Mar 15, 2013	13836934	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn	Abandoned
28411-23860/US	Nutritive Fragments, Proteins and Methods	ESS-008.US0	Mar 15, 2013	13836898	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn	Abandoned



28411-23862/US	Nutritive Proteins and Methods	ESS-006.USO	Mar 15, 2013	13836810	Geoffrey von Maltzahn, Michael J. Hamill, Rajeev Chillakuru, John F. Kramarczyk, David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver	Abandoned
28411-26118/PCT	Formulations Comprising Nutritive Polypeptides and Methods for Treating Cachexia, Sarcopenia and Muscle Atrophy	ESS-020.WO	Feb 26, 2014	PCTUS2014018807	Nathaniel W. Silver, Michael J. Hamill, Phillip Samayoa, Jay Hou, Luke Hamm, David Arthur Berry, Shaila Rahman, Geoffrey von Maltzahn, Yanqun Shu, Carine Robichon-Iyer	Abandoned
28411-27586/US	Nutritive Polypeptides Having Modulated Serine Content and Methods of Production and Use Thereof	ESS-076.PRO	Aug 18, 2014	62038766	Noubar B. Afeyan, David Arthur Berry	Abandoned
28411-27858/PCT	Compositions and Formulations for Non-Human Nutrition and Methods of Production and Use Thereof	ESS-068.WO	Sep 25, 2014	PCTUS2014057533	Kathryn Heard, Michael J. Hamill, Ying-Ja Chen, Nathaniel W. Silver, David Arthur Berry	Abandoned
28411-27864/US	Compositions and Formulations for Increasing Hepatic Function and Treatment and Prevention of Liver Diseases, and Methods of Production and Use Thereof	ESS-082.PRO	Sep 25, 2014	62055480	David Arthur Berry, Alison Williams, Nathaniel W. Silver, Luke Hamm, Ying-Ja Chen, Michael J. Hamill	Abandoned

28411-27865/US	Compositions and Formulations for Treatment of Neurological Disorders, and Methods of Production and Use Thereof	ESS-083.PRO	Sep 25, 2014	62055486	David Arthur Berry, Stephen Hoge, Nathaniel W. Silver, Michael J. Hamill, Alison Williams, John F. Kramarczyk, Phillip Samayoa	Abandoned
28411-27866/US	Therapeutic Nutritive Polypeptide Formulations and Methods of Production and Use Thereof	ESS-073.PRO2	Sep 25, 2014	62055426	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Allison Williams	Abandoned
28411-27926/PCT	Nutritive Polypeptide Production Systems, and Methods of Manufacture and Use Thereof	ESS-074.WO	Oct 9, 2014	PCTUS2014059923	Subhayu Basu, Ying-Ja Chen, Caitlyn Harvey, Katherine G. Gora, David Arthur Berry, David M. Young	Abandoned
28411-28617/US	ESS-084PRO: Polypeptide Compositions and Formulations for Restoration of Amino Acid Homeostasis, Treatment of Diseases and Conditions by Modulation of Autophagy and Methods of Production Thereof	ESS-084.PRO	Jan 9, 2015	62101879	Nathaniel W. Silver, Allison Williams, Robert Connelly, Peter Mueller, Michael J. Hamill, Noubar B. Afeyan, David Arthur Berry	Abandoned

28411-27351/US (T)	Nutritive Fragments, Proteins and Methods	ESS-008.US1	Mar 15, 2013	14374127	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn, Rajeev Chillakuru, Michael J. Hamill, John F. Kramarczyk	Allowed
28411-27002/US	REEXAMINATION OF 7,790,688: Compositions and Methods for Increasing Muscle Mass, Strength, and Functional Performance in the Elderly				Robert Wolfe, John Troup, Nicolaas Emile Paulus Deutz	Closed
28411-23836/PCT	Nucleic Acids, Cells, and Methods for Producing Secreted Proteins	ESS-012.WO	Apr 29, 2013	PCTUS2013038682	Gaozhong Shen, David M. Young, Subhayu Basu, Katherine G. Gora, Carine Robichon-Iyer, Nathaniel W. Silver, David Arthur Berry	Completed
28411-23857/PCT	Nutritive Fragments, Proteins and Methods	ESS-016.WO	Mar 15, 2013	PCTUS2013032180	Nathaniel W. Silver, David Arthur Berry, Rajeev Chillakuru, Geoffrey von Maltzahn, Michael J. Hamill	Completed

28411-23858/PCT	Nutritive Fragments and Proteins with Low or No Phenylalanine and Methods	ESS-011.WO	Mar 15, 2013	PCTUS2013032232	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn, Rajeev Chillakuru, Michael J. Hamill	Completed
28411-23859/PCT	Charged Nutritive Fragments, Proteins and Methods	ESS-009.WO	Mar 15, 2013	PCTUS2013032225	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn, Michael J. Hamill, Rajeev Chillakuru	Completed
28411-23860/PCT	Nutritive Fragments, Proteins and Methods	ESS-008.WO	Mar 15, 2013	PCTUS2013032218	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn, Rajeev Chillakuru, Michael J. Hamill	Completed
28411-23861/PCT	Charged Nutritive Proteins and Methods	ESS-007.WO	Mar 15, 2013	PCTUS2013032212	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn, Rajeev Chillakuru, Michael J. Hamill, John F. Kramarczyk	Completed

28411-23862/PCT	Nutritive Proteins and Methods	ESS-006.WO	Mar 15, 2013	PCTUS2013032206	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn, Rajeev Chillakuru, Michael J. Hamill	Completed
28411-25045/PCT	ESS-015WO: Engineered Secreted Proteins and Methods	ESS-015.WO	Nov 20, 2013	PCTUS2013071091	Subhayu Basu, Katherine G. Gora, Ying-Ja Chen, David M. Young, Nathaniel W. Silver, Michael J. Hamill, David Arthur Berry	Completed
28411-27855/PCT	Secreted Nutritive Polypeptides and Formulations Thereof, and Method of Production and Use Thereof	ESS-063.WO	Sep 25, 2014	PCTUS2014057526	John F. Kramarczyk, Ying-Ja Chen, Nathaniel W. Silver, Michael J. Hamill, David Arthur Berry, Geoffrey von Maltzahn, Caitlyn Harvey, Phillip Samayoa, Subhayu Basu, David M. Young	Completed

28411-27856/PCT	Nutritive Polypeptides and Formulations Thereof, and Method of Production and Use Thereof	ESS-064.WO	Sep 25, 2014	PCTUS2014057527	Michael J. Hamill, Kathryn Heard, David Arthur Berry, Geoffrey von Maltzahn, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman, John F. Kramarczyk, Brett Adam Boghigian, David M. Young, Subhayu Basu, Ying-Ja Chen, Michael Doherty	Completed
28411-27857/PCT	Edible Species Nutritive Polypeptides and Methods of Production and Use Thereof	ESS-065.WO	Sep 25, 2014	PCTUS2014057528	Ying-Ja Chen, Michael J. Hamill, Subhayu Basu, Geoffrey von Maltzahn, Jameson Rogers, Brett Adam Boghigian, Vimal Vaidya, Phillip Samayoa, John F. Kramarczyk, Shaila Rahman, David Arthur Berry, Nathaniel W. Silver	Completed

28411-27859/PCT	Compositions and Formulations for Treatment of Gastrointestinal Tract Malabsorption Diseases and Inflammatory Conditions and Methods of Production and Use Thereof	ESS-077.WO	Sep 25, 2014	PCTUS2014057534	Alison Williams, Michael J. Hamill, Nathaniel W. Silver, Ying-Ja Chen, David Arthur Berry, David V. Erbe, Chung-Wei Lee, Luke Hamm	Completed
28411-27860/PCT	Compositions and Formulations for Maintaining and Increasing Muscle Mass, Strength, and Performance and Methods of Production and Use Thereof	ESS-078.WO	Sep 25, 2014	PCTUS2014057537	Nathaniel W. Silver, Ying-Ja Chen, David Arthur Berry, Michael J. Hamill, Subhayu Basu, Luke Hamm, Alison Williams, David V. Erbe, Geoffrey von Maltzahn	Completed
28411-27861/PCT	Compositions and Formulations for Prevention and Reduction of Tumorigenesis, Cancer Cell Proliferation and Invasion, and Methods of Production and Use Thereof in Cancer Treatment	ESS-079.WO	Sep 25, 2014	PCTUS2014057542	Noubar B. Afeyan, Chung-Wei Lee, Nathaniel W. Silver, David Arthur Berry, Michael J. Hamill, David V. Erbe	Completed
28411-27862/PCT	Compositions and Formulations for Prevention and Treatment of Diabetes and Obesity, and Methods of Production and Use Thereof in Glucose and Caloric Control	ESS-080.WO	Sep 25, 2014	PCTUS2014057543	Nathaniel W. Silver, Luke Hamm, Carine Robichon-Iyer, Alison Williams, Michael J. Hamill, David Arthur Berry, Shaila Rahman, Kathryn Heard	Completed

28411-27863/PCT	Compositions and Formulations for Increasing Renal Function and Treatment and Prevention of Renal Diseases, and Methods of Production and Use Thereof	ESS-081.WO	Sep 25, 2014	PCTUS2014057546	Alison Williams, Nathaniel W. Silver, Andrew Downey, David V. Erbe, Michael J. Hamill, David Arthur Berry	Completed
28411-23675/US	Thermogenic Compositions and Methods of Use	ESS-022.PRO	Apr 2, 2013	61807433	Nathaniel W. Silver	Expired
28411-23798/US	Microorganisms and Methods for Producing Unsaturated Fatty Acids	ESS-004.PRO2	Dec 17, 2012	61737896	Subhayu Basu, Gaozhong Shen, Brett Adam Boghigian	Expired
28411-23799/US	Cyanobacterial Strains, Nucleic Acids, Proteins, and Expression Systems	ESS-005.PRO2	Jan 7, 2013	61749450	Gaozhong Shen, Subhayu Basu	Expired
28411-23800/US	Nutritive Proteins and Methods	ESS-006.PRO	Mar 26, 2012	61615791	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn	Expired
28411-23801/US	Charged Nutritive Proteins and Methods	ESS-007.PRO	Mar 26, 2012	61615816	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn	Expired
28411-23802/US	Nutritive Fragments, Proteins and Methods	ESS-008.PRO	Mar 26, 2012	61615819	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn	Expired



28411-23803/US	Charged Nutritive Fragments, Proteins and Methods	ESS-009.PRO	Mar 26, 2012	61615823	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn	Expired
28411-23804/US	Nutritive Fragments and Proteins with Low or No Phenylalanine and Methods	ESS-011.PRO	Mar 26, 2012	61615829	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn	Expired
28411-23805/US	Nucleic Acids, Cells, and Methods for Producing Secreted Proteins	ESS-012.PRO	Apr 27, 2012	61639673	Gaozhong Shen, David M. Young, Subhayu Basu	Expired
28411-23806/US	Nucleic Acids, Cells, and Methods for Producing Secreted Proteins	ESS-013.PRO	Apr 27, 2012	61639691	Gaozhong Shen, David M. Young, Subhayu Basu	Expired
28411-23807/US	Cyanobacteria Expression Systems and Methods	ESS-014.PRO	Apr 27, 2012	61639680	Gianguido Coffa, Katherine G. Gora	Expired
28411-23808/US	Engineered Secreted Proteins and Methods	ESS-015.PRO	Nov 20, 2012	61728427	Nathaniel W. Silver, Noubar B. Afeyan, David Arthur Berry, Rajeev Chillakuru, Geoffrey von Maltzahn	Expired
28411-23809/US	Nutritive Fragments, Proteins and Methods	ESS-016.PRO	Nov 20, 2012	61728685	Nathaniel W. Silver, David Arthur Berry, Rajeev Chillakuru, Geoffrey von Maltzahn	Expired

28411-23810/US	Antihypertensive Peptides, Proteins, Compositions and Methods	ESS-017.PRO	Nov 16, 2012	61727635	David Arthur Berry, Rajeev Chillakuru, Nathaniel W. Silver, Susan Trimbo, Geoffrey von Maltzahn	Expired
28411-23811/US	Peptides, Proteins, Compositions and Methods for the Treatment of Diabetes and Diabetes-Related Conditions	ESS-018.PRO	Nov 16, 2012	61727646	David Arthur Berry, Rajeev Chillakuru, Nathaniel W. Silver, Susan Trimbo, Geoffrey von Maltzahn	Expired
28411-23812/US	Recombinant Proteins, Compositions, and Methods for Increasing Polypeptide Absorption and Cellular Uptake	ESS-019.PRO	Feb 26, 2013	61769429	Nathaniel W. Silver	Expired
28411-23813/US	Peptides, Proteins, Compositions and Methods for Improving Muscle Health and Maintenance	ESS-020.PRO	Feb 26, 2013	61769444	Nathaniel W. Silver	Expired
28411-23814/US	Peptides, Proteins, Compositions and Methods for Improving Muscle Health and Maintenance	ESS-021.PRO	Apr 5, 2013	61808650	Nathaniel W. Silver	Expired
28411-23856/US	Engineered Nutritive Proteins and Methods	ESS-010.PRO	Mar 26, 2012	61615824	David Arthur Berry, Adam Joseph Rubin, Geoffrey von Maltzahn	Expired
28411-23863/US	Cyanobacterial Strains, Nucleic Acids, Proteins, and Expression Systems	ESS-005.PRO	Jan 4, 2012	61583068	Gaozhong Shen, Subhayu Basu	Expired
28411-23864/US	Microorganisms and Methods for Producing Unsaturated Fatty Acids	ESS-004.PRO	Dec 14, 2011	61570774	Subhayu Basu, Gaozhong Shen, Brett Adam Boghigian	Expired

28411-24529/US	Nutritive Polypeptides Having Modulated Alanine Content, and Methods of Production and Use Thereof	ESS-023.PRO	Sep 25, 2013	61882211	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24530/US	Nutritive Polypeptides Having Modulated Arginine Content, and Methods of Production and Use Thereof	ESS-024.PRO	Sep 25, 2013	61882214	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24531/US	Nutritive polypeptides having modulated asparagine content, and methods of production and use thereof	ESS-025.PRO	Sep 25, 2013	61882219	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24532/US	Nutritive polypeptides having modulated aspartic acid content, and methods of production and use thereof	ESS-026.PRO	Sep 25, 2013	61882220	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24533/US	Nutritive polypeptides having modulated cysteine content, and methods of production and use thereof	ESS-027.PRO	Sep 25, 2013	61882225	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24534/US	Nutritive polypeptides having modulated glutamine content, and methods of production and use thereof	ESS-028.PRO	Sep 25, 2013	61882229	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24535/US	Nutritive polypeptides having modulated glutamic acid content, and methods of production and use thereof	ESS-029.PRO	Sep 25, 2013	61882232	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24536/US	Nutritive polypeptides having modulated glycine content, and methods of production and use thereof	ESS-030.PRO	Sep 25, 2013	61882234	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24537/US	Nutritive polypeptides having modulated histidine content, and methods of production and use thereof	ESS-031.PRO	Sep 25, 2013	61882235	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24538/US	Nutritive polypeptides having modulated isoleucine content, and methods of production and use thereof	ESS-032.PRO	Sep 25, 2013	61882240	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24539/US	Nutritive polypeptides having modulated leucine content, and methods of production and use thereof	ESS-033.PRO	Sep 25, 2013	61882129	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24540/US	Nutritive polypeptides having modulated lysine content, and methods of production and use thereof	ESS-034.PRO	Sep 25, 2013	61882243	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24541/US	Nutritive polypeptides having modulated methionine content, and methods of production and use thereof	ESS-035.PRO	Sep 25, 2013	61882246	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24542/US	Nutritive polypeptides having modulated phenylalanine content, and methods of production and use thereof	ESS-036.PRO	Sep 25, 2013	61882250	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24543/US	Nutritive polypeptides having modulated proline content, and methods of production and use thereof	ESS-037.PRO	Sep 25, 2013	61882254	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24544/US	Nutritive polypeptides having modulated serine content, and methods of production and use thereof	ESS-038.PRO	Sep 25, 2013	61882260	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24545/US	Nutritive polypeptides having modulated threonine content, and methods of production and use thereof	ESS-039.PRO	Sep 25, 2013	61882264	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24546/US	Nutritive polypeptides having modulated tryptophan content, and methods of production and use thereof	ESS-040.PRO	Sep 25, 2013	61882267	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired



28411-24547/US	Nutritive polypeptides having modulated tyrosine content, and methods of production and use thereof	ESS-041.PRO	Sep 25, 2013	61882271	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24548/US	Nutritive polypeptides having modulated valine content, and methods of production and use thereof	ESS-042.PRO	Sep 25, 2013	61882274	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24549/US	Nutritive polypeptides having modulated alanine containing dipeptide content, and methods of production and use thereof	ESS-043.PRO	Sep 25, 2013	61882062	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24550/US	Nutritive polypeptides having modulated arginine containing dipeptide content, and methods of production and use thereof	ESS-044.PRO	Sep 25, 2013	61882063	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24551/US	Nutritive polypeptides having modulated asparagine containing dipeptide content, and methods of production and use thereof	ESS-045.PRO	Sep 25, 2013	61882065	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24552/US	Nutritive polypeptides having modulated aspartic acid containing dipeptide content, and methods of production and use thereof	ESS-046.PRO	Sep 25, 2013	61882066	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24553/US	Nutritive polypeptides having modulated cysteine containing dipeptide content, and methods of production and use thereof	ESS-047.PRO	Sep 25, 2013	61882067	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24554/US	Nutritive polypeptides having modulated glutamine containing dipeptide content, and methods of production and use thereof	ESS-048.PRO	Sep 25, 2013	61882068	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24555/US	Nutritive polypeptides having modulated glutamic acid containing dipeptide content, and methods of production and use thereof	ESS-049.PRO	Sep 25, 2013	61882069	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24556/US	Nutritive polypeptides having modulated glycine containing dipeptide content, and methods of production and use thereof	ESS-050.PRO	Sep 25, 2013	61882070	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24557/US	Nutritive polypeptides having modulated histidine containing dipeptide content, and methods of production and use thereof	ESS-051.PRO	Sep 25, 2013	61882072	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24558/US	Nutritive polypeptides having modulated isoleucine containing dipeptide content, and methods of production and use thereof	ESS-052.PRO	Sep 25, 2013	61882074	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24559/US	Nutritive Polypeptides Having Modulated Leucine Containing Dipeptide Content, and Methods of Production and Use Thereof	ESS-053.PRO	Sep 25, 2013	61882029	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24560/US	Nutritive polypeptides having modulated lysine containing dipeptide content, and methods of production and use thereof	ESS-054.PRO	Sep 25, 2013	61882078	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24561/US	Nutritive polypeptides having modulated methionine containing dipeptide content, and methods of production and use thereof	ESS-055.PRO	Sep 25, 2013	61882079	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24562/US	Nutritive polypeptides having modulated phenylalanine containing dipeptide content, and methods of production and use thereof	ESS-056.PRO	Sep 25, 2013	61882080	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24563/US	Nutritive polypeptides having modulated proline containing dipeptide content, and methods of production and use thereof	ESS-057.PRO	Sep 25, 2013	61882082	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24564/US	Nutritive Polypeptides Having Modulated Serine Containing Dipeptide Content, and Methods of Production and Use Thereof	ESS-058.PRO	Sep 25, 2013	61882086	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24565/US	Nutritive Polypeptides Having Modulated Threonine Containing Dipeptide Content, and Methods of Production and Use Thereof	ESS-059.PRO	Sep 25, 2013	61882087	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24566/US	Nutritive Polypeptides Having Modulated Tryptophan Containing Dipeptide Content, and Methods of Production and Use Thereof	ESS-060.PRO	Sep 25, 2013	61882088	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24567/US	Nutritive Polypeptides Having Modulated Tyrosine Containing Dipeptide Content, and Methods of Production and Use Thereof	ESS-061.PRO	Sep 25, 2013	61882090	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired

28411-24568/US	Nutritive Polypeptides Having Modulated Valine Containing Dipeptide Content, and Methods of Production and Use Thereof	ESS-062.PRO	Sep 25, 2013	61882092	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Jay Hou, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Shaila Rahman	Expired
28411-24569/US	Secreted Nutritive Polypeptides and Formulations Thereof, and Method of Production and Use Thereof	ESS-063.PRO	Sep 25, 2013	61882180	David Arthur Berry, David M. Young, Geoffrey von Maltzahn, Michael J. Hamill, Nathaniel W. Silver, Subhayu Basu, Ying-Ja Chen	Expired
28411-24570/US	Secreted Nutritive Polypeptides and Formulations Thereof, and Method of Production and Use Thereof	ESS-064.PRO	Sep 25, 2013	61882189	Brett Adam Boghigian, David Arthur Berry, David V. Erbe, David M. Young, Geoffrey von Maltzahn, John F. Kramarczyk, Michael J. Hamill, Nathaniel W. Silver, Subhayu Basu, Ying-Ja Chen	Expired



28411-24571/US	Isolated human food polypeptides and methods of production and use thereof	ESS-065.PRO	Sep 25, 2013	61882198	David Arthur Berry, Geoffrey von Maltzahn, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Vimal Vaidya	Expired
28411-24572/US	Compositions and Formulations for Nutrition and Methods of Production and Use Thereof	ESS-066.PRO	Sep 25, 2013	61882212	Brett Adam Boghigian, David Arthur Berry, David M. Young, Geoffrey von Maltzahn, John F. Kramarczyk, Katherine G. Gora, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Subhayu Basu, Vimal Vaidya	Expired

28411-24573/US	Compositions and Formulations for Nutrition and Methods of Production and use Thereof	ESS-067.PRO	Sep 25, 2013	61882222	Brett Adam Boghigian, David Arthur Berry, David V. Erbe, David M. Young, Geoffrey von Maltzahn, John F. Kramarczyk, Katherine G. Gora, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Subhayu Basu, Vimal Vaidya	Expired
28411-24574/US	Compositions and formulations for non-human nutrition and methods of production and use thereof	ESS-068.PRO	Sep 25, 2013	61882233	Brett Adam Boghigian, David Arthur Berry, David V. Erbe, David M. Young, Geoffrey von Maltzahn, Jay Hou, John F. Kramarczyk, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Subhayu Basu, Shaila Rahman, Vimal Vaidya, Ying-Ja Chen	Expired

28411-24575/US	Charged and charge-modified nutritive polypeptides, and methods of production and use thereof	ESS-069.PRO	Sep 25, 2013	61882239	Brett Adam Boghigian, David Arthur Berry, Geoffrey von Maltzahn, Michael J. Hamill, Nathaniel W. Silver, Ying-Ja Chen	Expired
28411-24576/US	Expressed nutritive glycopolypeptides and methods of production and use thereof	ESS-070.PRO	Sep 25, 2013	61882300	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa	Expired
28411-24577/US	Compositions and formulations for nutrition depleted of anti-nutritive factors and anti-nutritive sequences, and methods of use thereof	ESS-071.PRO	Sep 25, 2013	61882295	David Arthur Berry, Geoffrey von Maltzahn, Michael J. Hamill, Nathaniel W. Silver	Expired
28411-24578/US	Nutritive polypeptides with modulated viscosity and methods of production and use thereof	ESS-072.PRO	Sep 25, 2013	61882305	David Arthur Berry, Geoffrey von Maltzahn, Michael J. Hamill, Nathaniel W. Silver	Expired

28411-24580/US	Therapeutic Nutritive Polypeptide Formulations and Methods of Production and Use Thereof	ESS-073.PRO	Sep 25, 2013	61882335	David Arthur Berry, David V. Erbe, Geoffrey von Maltzahn, Michael J. Hamill, Nathaniel W. Silver, Phillip Samayoa, Allison Williams	Expired
28411-24705/US	Production Systems, and Methods of Manufacture and Use Thereof	ESS-074.PRO	Oct 10, 2013	61889205	David M. Young, Katherine G. Gora, Subhayu Basu, David Arthur Berry	Expired
28411-25047/US	Engineered Secreted Proteins and Methods	ESS-075.PRO	Nov 20, 2013	61906862	Subhayu Basu, Katherine G. Gora, Ying-Ja Chen, David M. Young, Nathaniel W. Silver, Michael J. Hamill, David Arthur Berry	Expired
28411-28942/US	Recombinant Nutritional Proteins, Nutritional Compositions and Uses Thereof	L6-16.PRO1	Jul 10, 2010	61397108	Noubar B. Afeyan, David Arthur Berry, Geoffrey von Maltzahn	Expired
28411-28943/US	Recombinant Nutritional Polysaccharides, Nutritional Compositions and Uses Thereof	L6-16.PRO2	Aug 23, 2010	61402073	Noubar B. Afeyan, David Arthur Berry, Geoffrey von Maltzahn	Expired

28411-23797/US	Microorganisms and Methods for Producing Unsaturated Fatty Acids	ESS-003.US1	Dec 14, 2011	13326211	Subhayu Basu, Gaozhong Shen, Brett Adam Boghigian, David M. Young, David Arthur Berry, Geoffrey von Maltzahn	Issued
28411-23861/US	Charged Nutritive Proteins and Methods	ESS-007.US1	Mar 15, 2013	13836855	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn, Michael J. Hamill, Rajeev Chillakuru, John F. Kramarczyk	Issued
28411-26373/US (T)	Charged Nutritive Proteins and Methods	ESS-007.US2	Mar 19, 2014	14219943	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn, Michael J. Hamill, Rajeev Chillakuru, John F. Kramarczyk	Issued

28411-23836/US (T)	Nucleic Acids, Cells, and Methods for Producing Secreted Proteins	ESS-012.US	Apr 29, 2013	14397412	Gaozhong Shen, David M. Young, Subhayu Basu, Katherine G. Gora, Carine Robichon-Iyer, Nathaniel W. Silver, David Arthur Berry, John F. Kramarczyk	Pending
28411-25045/US (T)	ESS-015US: Engineered Secreted Proteins and Methods	ESS-015.US	Nov 20, 2013	14443773	Subhayu Basu, Katherine G. Gora, Ying-Ja Chen, David M. Young, Nathaniel W. Silver, Michael J. Hamill, David Arthur Berry	Pending
28411-27119/US (T)	Microorganisms, Compositions, and Methods for Producing Fatty Acids	ESS-003.US2	Jul 18, 2014	14335071	Subhayu Basu, Gaozhong Shen, Brett Adam Boghigian, David M. Young, David Arthur Berry, Geoffrey von Maltzahn	Pending
28411-27336/US (T)	Charged Nutritive Proteins and Methods	ESS-007.US3	Jul 22, 2014	14337563	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Geoffrey von Maltzahn, Michael J. Hamill, Rajeev Chillakuru, John F. Kramarczyk	Pending

28411-27800/US (T)	Nutritive Proteins and Methods	ESS-006.US1	Mar 15, 2013	14387675	Geoffrey von Maltzahn, Michael J. Hamill, Rajeev Chillakuru, John F. Kramarczyk, David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver	Pending
28411-27801/US (T)	Charged Nutritive Fragments, Proteins and Methods	ESS-009.US1	Mar 15, 2013	14387677	Michael J. Hamill, Nathaniel W. Silver, Rajeev Chillakuru, John F. Kramarczyk, David Arthur Berry, Brett Adam Boghigian, Geoffrey von Maltzahn	Pending
28411-27802/US (T)	Nutritive Fragments and Proteins with Low or No Phenylalanine and Methods	ESS-011.US1	Mar 15, 2013	14387679	David Arthur Berry, Brett Adam Boghigian, Nathaniel W. Silver, Michael J. Hamill, Geoffrey von Maltzahn, John F. Kramarczyk, Rajeev Chillakuru	Pending
28411-27803/US (T)	Nutritive Fragments, Proteins and Methods	ESS-016.US1	Mar 15, 2013	14387684	Nathaniel W. Silver, Geoffrey von Maltzahn, Michael J. Hamill, David Arthur Berry	Pending

28411-27859/US	Compositions and Formulations for Treatment of Gastrointestinal Tract Malabsorption Diseases and Inflammatory Conditions and Methods of Production and Use Thereof	ESS-077.US1	Sep 25, 2014	15024636	Alison Williams, Michael J. Hamill, Nathaniel W. Silver, Ying-Ja Chen, David Arthur Berry, David V. Erbe, Chung-Wei Lee, Luke Hamm	Pending
28411-27860/US	Compositions and Formulations for Maintaining and Increasing Muscle Mass, Strength, and Performance and Methods of Production and Use Thereof	ESS-078.US1	Sep 25, 2014	15024639	Nathaniel W. Silver, Ying-Ja Chen, David Arthur Berry, Michael J. Hamill, Subhayu Basu, Luke Hamm, Alison Williams, David V. Erbe, Geoffrey von Maltzahn	Pending
28411-27861/US	Compositions and Formulations for Prevention and Reduction of Tumorigenesis, Cancer Cell Proliferation and Invasion, and Methods of Production and Use Thereof in Cancer Treatment	ESS-079.US1	Sep 25, 2014	15024641	Noubar B. Afeyan, Chung-Wei Lee, Nathaniel W. Silver, David Arthur Berry, Michael J. Hamill, David V. Erbe	Pending
28411-27862/US	Compositions and Formulations for Prevention and Treatment of Diabetes and Obesity, and Methods of Production and Use Thereof in Glucose and Caloric Control	ESS-080.US1	Sep 25, 2014	15024644	Nathaniel W. Silver, Luke Hamm, Carine Robichon-Iyer, Alison Williams, Michael J. Hamill, David Arthur Berry, Shaila Rahman, Kathryn Heard	Pending



28411-27863/US	Compositions and Formulations for Increasing Renal Function and Treatment and Prevention of Renal Diseases, and Methods of Production and Use Thereof	ESS-081.US1	Sep 25, 2014	15024648	Alison Williams, Nathaniel W. Silver, Andrew Downey, David V. Erbe, Michael J. Hamill, David Arthur Berry	Pending
28411-29863/US	Nutritive Polypeptides Having Modulated Serine Content, and Methods of Production and Use Thereof	ESS-076.PRO2	Aug 19, 2015	62207040	Noubar B. Afeyan, David Arthur Berry	Pending
28411-33523/US	Nutritive Polypeptides and Formulations Thereof, and Methods of Production and Use Thereof	ESS-088.US1	Mar 25, 2016	15081004	Michael J. Hamill, Brett Adam Boghigian, Caitlyn Harvey, David Arthur Berry, David M. Young, Geoffrey von Maltzahn, John F. Kramarczyk, Jameson Rogers, Kathryn Heard, Michael Doherty, Nathaniel W. Silver, Phillip Samayoa, Subhayu Basu, Shaila Rahman, Vimal Vaidya, Ying-Ja Chen	Pending