

Summary Report

Riboflavin 5'-phosphate sodium

Prepared for:

Food and Drug Administration

Clinical use of bulk drug substances nominated for inclusion on the 503B Bulks List

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REVIEW OF NOMINATIONS

Riboflavin 5'-phosphate sodium (UNII code: TLM2976OFR) was nominated for inclusion on the 503B Bulks List by Fagron, Outsourcing Facilities Association (OFA), McGuff Compounding Pharmacy Services, Inc. (McGuff CPS), American Association of Naturopathic Physicians (AANP), Alliance for Natural Health USA (ANH-USA), Integrative Medicine Consortium (IMC), and David Smith.

Riboflavin 5'-phosphate sodium was nominated for combination use as a component of the Meyer's cocktail; vitamin B complex injections; a combination product with thiamine, niacinamide, pyridoxine, and dexpanthenol; in combination with methionine, inositol, choline, and vitamin B complex injection; and an unspecified combination product.

Riboflavin 5'-phosphate sodium was nominated for use as a 0.1%-0.25% ophthalmic preparation, with concentrations greater than 0.25% needed depending on the patient, in combination with ultraviolet-A irradiation for treatment of progressive keratoconus. Riboflavin 5'-phosphate sodium was also nominated for use as an immune boost, energy metabolism, vitamin deficiency, and migraines in a 2-20mg/mL injection. Additionally, riboflavin 5'-phosphate sodium was nominated for use in riboflavin deficiency with enzymatic disorder, microcytic anemia, migraine, muscle cramp, and burning feet syndrome as a 2-100mg/mL intravenous (IV) and intramuscular (IM) injection available as both a multi-dose and preservative-free vial. Lastly, riboflavin 5'-phosphate sodium was nominated as a combination product for use in vitamin deficiency as a 50mg/mL IM injection, or per the prescribers' request.

Reasons provided for nomination to 503B Bulks List are as follows:

- Only two concentrations of the ophthalmic preparation exist on the market and since keratoconus is a progressive disease there is a need for varying concentrations depending on the severity of the disease.
- Patients respond differently and the compounded product may be the only product to effectively treat the indication for which it is intended to treat.
- Meyer's cocktail and vitamin B complex injections contain many ingredients and pose a safety risk when a prescriber must mix in office.
- A greater concentration than what is commercially available may be needed.
- A patient may need a prescribed dosage form or strength that is not commercially available or the dosage form, strength, or flavor of the manufactured product may be inappropriate for the patient.
- Patient sensitivities to dyes, fillers, preservatives, and other excipients contained in commercially available products.
- Manufacturer backorders can create a situation where the patient is not able to obtain the drug product or it is extremely difficult for the patient to obtain the drug product. Compounding pharmacies can alleviate this strain by compounding from the bulk substance.
- There is no FDA-approved injectable product containing riboflavin 5'-phosphate sodium as a single active pharmaceutical ingredient (API) in the strength prescribed by US-licensed physicians.
- There is no FDA-approved product that combines riboflavin 5'-phosphate sodium with methionine, inositol, choline, and vitamin B complex.
- Individual finished products have considerable variance in the actual API which may introduce unacceptable inaccuracies into the compounded medication.

METHODOLOGY

Background information

The national medicine registers of 13 countries and regions were searched to establish the availability of riboflavin 5'-phosphate sodium products in the United States (US) and around the world. The World Health Organization, the European Medicines Agency (EMA), and globalEDGE were used to identify regulatory agencies in non-US countries. The medicine registers of non-US regulatory agencies were selected for inclusion if they met the following criteria: freely accessible; able to search and retrieve results in English language; and desired information, specifically, product trade name, active ingredient, strength, form, route of administration (ROA), and approval status, provided in a useable format. Based on these criteria, the medicine registers of 13 countries/regions were searched: US, Canada, European Union (EU), United Kingdom (UK), Ireland, Belgium, Latvia, Australia, New Zealand, Saudi Arabia, Abu Dhabi, Hong Kong, and Namibia. Both the EMA and the national registers of select EU countries (Ireland, UK, Belgium, and Latvia) were searched because some medicines were authorized for use in the EU and not available in a member country and vice versa.

Each medicine register was searched for riboflavin 5'-phosphate sodium; name variations of riboflavin 5'-phosphate sodium were entered if the initial search retrieved no results. The following information from the search results of each register was recorded in a spreadsheet: product trade name; active ingredient; strength; form; ROA; status and/or schedule; approval date. Information was recorded only for products with strengths, forms and/or ROA similar to those requested in the nominations.

In addition to the aforementioned medicine registers, the DrugBank database (version 5.1.4) and the Natural Medicines database were searched for availability of over-the-counter (OTC) products containing riboflavin 5'-phosphate sodium. The availability of OTC products (yes/no) in the US and the ROA of these products were recorded in a spreadsheet. Individual product information was not recorded.

Systematic literature review

Search strategy

Two databases (PubMed and Embase) were searched including any date through June 4, 2019. The search included a combination ("riboflavin 5 phosphate sodium"[TIAB] OR "flavine mononucleotide"[TIAB]) AND (solution OR intravenous OR intramuscular OR injection OR ophthalmic OR "vitamin b" OR niacinamide OR nicotinamide OR methionine OR inositol OR choline OR pyridoxine OR dextranthenol) AND humans[MeSH Terms] AND English[lang]. Peer-reviewed articles as well as grey literature were included in the search. Search results from each database were exported to Covidence®, merged, and sorted for removal of duplicate citations. Microsoft Excel® was used for screening purposes.

Study selection

Literature reviews and/or meta-analyses, cost-effectiveness, and epidemiological studies were excluded. Riboflavin is a component of an FDA-approved product, as a result, articles were excluded if riboflavin was utilized as the FDA-approved product or in the same concentration and formulation as the FDA-approved product. Articles were considered relevant based on the identification of a clinical use of riboflavin or the implementation of riboflavin in clinical practice. Articles were excluded if not in English, a clinical use was not identified, incorrect salt form, or if the study was not

conducted in humans. Screening of all titles, abstracts, and full-text were conducted independently by two reviewers. All screening disagreements were reconciled by a third reviewer.

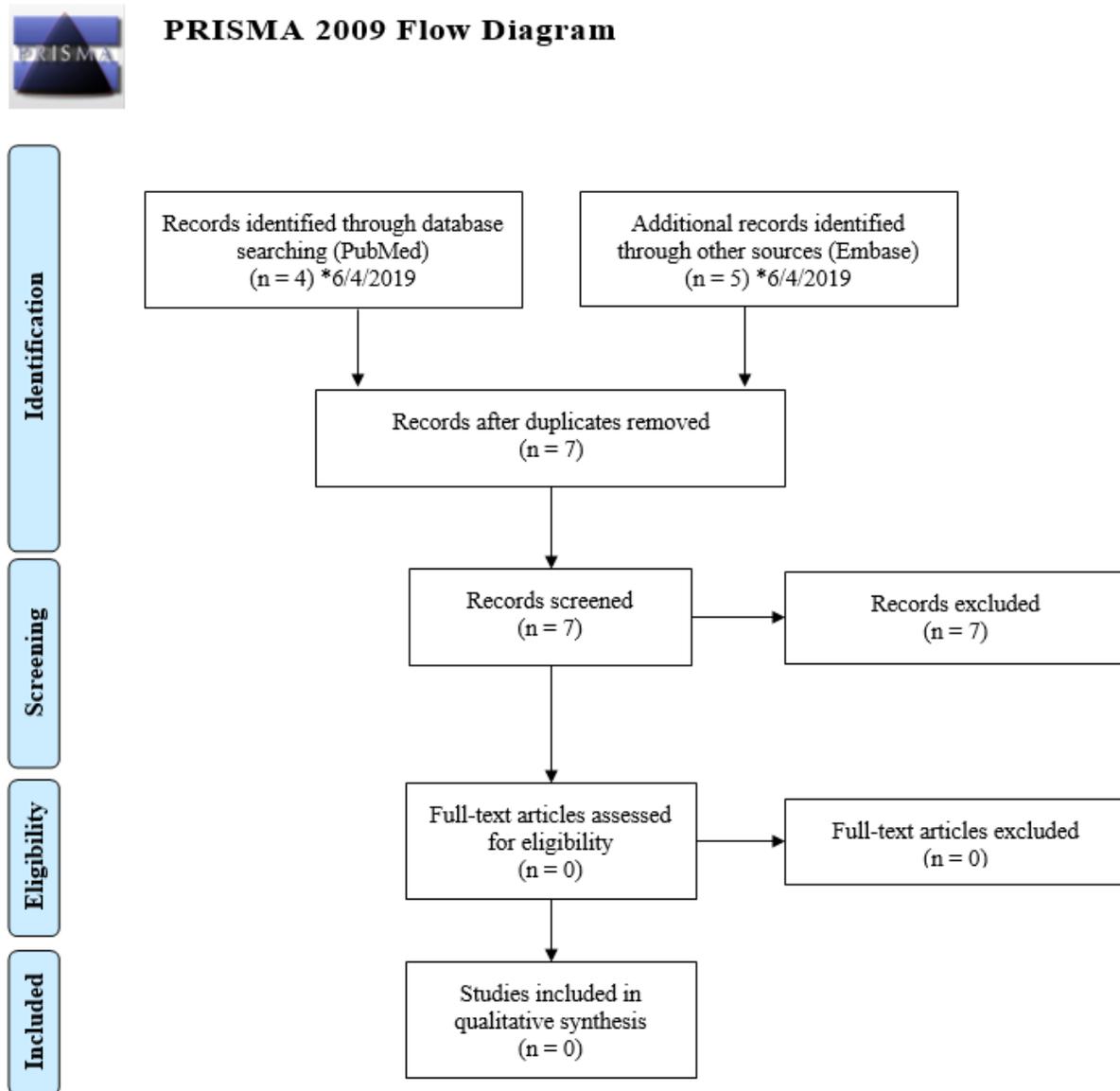
Data extraction

A standard data extraction form was used to collect study authors; article title; year published; journal title; country; indication for riboflavin; dose; strength; dosage form; ROA; frequency and duration of therapy; any combination therapy utilized; if applicable, formulation of compounded products; study design; and any discussion surrounding the use of riboflavin compared to alternative therapies.

Results

Please refer to Figure 1.

Figure 1. Summary of literature screening and selection (PRISMA 2009 Flow Diagram)



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

Outreach to medical specialists and specialty organizations

Using the indications from the nominations and the results of the literature review, six medical specialties that would potentially use riboflavin 5'-phosphate sodium were identified: naturopathy, ophthalmology, hematology, neurology, primary care, and medicine. Semi-structured interviews were conducted with subject matter experts within this specialty. Criteria for selecting subject matter experts included recommendations provided by specialty professional associations, convenient geographic location, authorship within the specialty, or referral by an interviewee. Up to nine (9) interviews were conducted per substance. One (1) medical expert specializing in ophthalmology was contacted via email regarding scheduling an interview; the interviewee provided their response via email. One (1) medical expert specializing in neurology was contacted for an interview; however, the interviewee failed to respond to the interview request. No interviews were conducted.

Survey

General professional medical associations and specialty associations for naturopathy, ophthalmology, hematology, neurology, and primary care, identified from the nominations, were contacted to facilitate distribution of an online survey. A Google™ search was conducted to identify relevant professional associations within each specialty. Associations were included if their members are predominantly practitioners, national associations, and organizations focused on practice within the US. Organizations without practicing physicians and state or regional organizations were excluded. The association's website was searched in order to identify the email of the executive director, regulatory director, media director, association president, board members, or other key leaders within the organization to discuss survey participation. If no contact information was available, the "contact us" tab on the association website was used.

An online survey was created using Qualtrics® software (Provo, UT). The survey link was distributed to four (4) associations. If an association had more than one (1) substance with indications relevant to that specialty, substances were combined into one (1) survey with no more than 14 substances per survey. Table 1 highlights the associations that agreed to distribute the survey link and Table 2 includes the associations that declined to participate. Additionally, single substance surveys were created and posted on the project website, which was shared with survey participants.

Participation was anonymous and voluntary. The estimated time for completion was 30 minutes with a target of 50 responses per survey. The Office of Management and Budget (OMB) approved this project.

Table 1. Participating associations

Specialty	Association
Naturopathy	American Association of Naturopathic Physicians (AANP)
Ophthalmology	American Academy of Ophthalmology (AAO)
	American Society of Cataract and Refractive Surgery (ASCRS)
	American Society of Retina Specialist (ASRS)
Primary Care	American Academy of Environmental Medicine (AAEM)

Table 2. Associations that declined participation

Specialty	Association	Reasons for Declining
Hematology	American Society of Hematology (ASM)	Failed to respond
Neurology	American Academy of Neurology (AAN)	Failed to respond
Medicine	American Medical Association (AMA)	Failed to respond
	American Osteopathic Association (AOA)	Failed to respond
Primary Care	The American Academy of Family Physicians (AAFP)	Failed to respond
	American College of Physicians (ACP)	Failed to respond

CURRENT AND HISTORIC USE

Summary of background information

- Riboflavin 5'-phosphate sodium is FDA-approved for use in the United States. Riboflavin is available as a combination product for IV injection with other vitamins and minerals as well as an ophthalmic solution.
- Riboflavin is available in various oral dosage forms as an OTC product in the US.
- There is a current United States Pharmacopeia (USP) monograph for riboflavin 5'-phosphate sodium.
- Riboflavin 5'-phosphate sodium is available as various combination products for IV and IM injection with other vitamins and minerals in Canada, the UK, Ireland, Belgium, Latvia, Australia, New Zealand, Saudi Arabia, Hong Kong, and Namibia. No ophthalmic products were identified.

Table 3. Currently approved products – US^a

Product	Active Ingredient	Concentration	Dosage Form	ROA	Status	Approval Date
Infuvite Adult	Alpha -tocopherol acetate, ascorbic acid, biotin, cholecalciferol, cyanocobalamin, dexpanthenol, folic acid, nia cinamide, pyridoxine HCl, riboflavin 5'-phosphatesodium , thiamine HCl, vitamin A palmitate, vitamin K	2IU/mL, 40mg/mL, 12mcg/mL, 40IU/mL, 1mcg/mL, 3mg/mL, 120mcg/mL, 8mg/mL, 1.2mg/mL, 0.72mg/mL , 1.2mg/mL, 660IU/mL, 0.03mg/mL	Solution	Intra venous	Rx	5/18/2000
Infuvite Pediatric	Ascorbic acid, biotin, cholecalciferol, cyanocobalamin, dexpanthenol, folic acid, nia cinamide, pyridoxine, riboflavin , thiamine, tocopherol acetate, vitamin A, vitamin K	80mg/vial, 0.02mg/vial, 400IU/vial, 0.001mg/vial, 5mg/vial, 0.14mg/vial, 17mg/vial, 1mg/vial, 1.4mg/vial , 1.2mg/vial, 7IU/vial, 2,300IU/vial, 0.2mg/vial	–	Intra venous	Rx	2/21/2001
M.V.I. Adult	Ascorbic acid, biotin, cyanocobalamin, dexpanthenol, ergocalciferol, folic acid, nia cinamide, pyridoxine HCl, riboflavin 5'-phosphate sodium , thiamine HCl, vitamin A, vitamin E, vitamin K	200mg/vial, 0.06mg/vial, 0.005mg/vial, 15mg/vial, 0.005mg/vial, 0.6mg/vial, 40mg/vial , 6mg/vial, 3.6mg/vial, 6mg/vial, 1mg/vial, 10mg/vial, 0.15mg/vial	–	Intra venous	Rx	1/30/2004
M.V.I. Pediatric	Ascorbic acid, biotin, cyanocobalamin, dexpanthenol, ergocalciferol, folic acid, nia cinamide, phytonadione, pyridoxine HCl, riboflavin 5'-phosphatesodium , thiamine HCl, vitamin A, vitamin E	80mg/vial, 0.02mg/vial, 0.001mg/vial, 5mg/vial, 0.01mg/vial, 0.14mg/vial, 17mg/vial, 0.2mg/vial, 1mg/vial, 1.4mg/vial , EQ 1.2mg base/vial, 0.7mg/vial, 7mg/vial	Solution	Intra venous	Rx	9/21/2000
Photrexa Photrexa viscous in dextran 20%	Riboflavin 5'-phosphate sodium	0.146%	Solution	Ophthalmic	Rx	4/15/2016

Abbreviations: “–”, not mentioned; ROA, route of administration; Rx, prescription.

^aSource: US FDA *Approved Drug Products with Therapeutic Equivalence Evaluations* (Orange Book).

Table 4. Currently approved products – select non-US countries and regions^{a,b}

Active Ingredient	Concentration	Dosage Form	ROA	Country	Status	Approval Date ^c
Riboflavin	–	–	Injection	Hong Kong	Rx	4/28/1982
		Solution		Latvia		12/19/2005
Riboflavin	100, 100, 1mg	Solution	Intramuscular	Saudi Arabia	Rx	–
	4mg/5mL			UK		10/1993
Riboflavin	0.72-1.4mg/mL	Solution	Intra venous	Canada	Ethical, Rx	12/31/1994
				Ireland	Rx	8/2/1987
				UK		10/1993
Riboflavin	3.6-4.14mg/vial	Powder for Solution	Intra venous	Ireland	Rx	1/4/1993
				UK	Rx	9/29/1997
Riboflavin sodium phosphate	–	–	Injection	Hong Kong	Rx	8/7/1979
		Solution		Latvia		1/17/2001
Riboflavin sodium phosphate	2-5mg/mL	Solution	Intramuscular	Australia	Rx	10/8/1991
Riboflavin sodium phosphate	2.5mg/mL	Solution	Intra venous	Australia	Rx	10/8/1991
Riboflavin sodium phosphate	4.575-5.67mg	Powder for Solution	Intra venous	Australia	Rx	8/21/1992
				New Zealand	General Sale	8/9/1988
				Belgium	Rx	12/17/1990

Abbreviations: “–”, not mentioned; ROA, route of administration; Rx, prescription; UK, United Kingdom.

^aMedicine registers of national regulatory agencies were searched if they met the following criteria: freely accessible; able to search and retrieve results in English language; and desired information (product trade name, active ingredient, strength, form, route of administration and approval status) provided in a useable format. Information was recorded only for products with strengths, forms and/or routes of administration similar to those requested in the nominations. See Methodology for full explanation.

^bOnly combination products were identified in the register search; only the riboflavin component was included in the table.

^cIf multiple approval dates and/or multiple strengths, then earliest date provided.

Summary of literature review

No studies were identified that met the inclusion criteria.

Table 5. Types of studies

No studies identified that met the inclusion criteria.

Table 6. Number of studies by country

No studies identified that met the inclusion criteria.

Table 7. Number of studies by combinations

No studies identified that met the inclusion criteria.

Table 8. Dosage by indication – US

No studies identified that met the inclusion criteria.

Table 9. Dosage by indication – non-US countries

No studies identified that met the inclusion criteria.

Table 10. Compounded products – US

No studies identified that met the inclusion criteria.

Table 11. Compounded products – non-US countries

No studies identified that met the inclusion criteria.

Summary of focus groups/interviews of medical experts and specialty organizations

No interviews were conducted. One (1) medical expert specializing in ophthalmology was contacted via email regarding scheduling an interview; the expert provided their response via email. One (1) medical expert specializing in neurology was contacted for an interview; however, the interviewee failed to respond to the interview request.

- The ophthalmologist replied that animal models exist utilizing higher concentrations of riboflavin 5'-phosphate sodium to induce collagen cross-linking in the cornea to treat keratoconus¹, however the respondent is not aware of human trials utilizing concentrations greater than the commercially available product.

Table 12. Overview of interviewee

No interview was conducted

Summary of survey results

Table 13. Characteristics of survey respondents [58 people responded to the survey^a]

Board Certification	MD	ND	NP	No Response
Cardiovascular Disease	0	0	1	0
Internal Medicine	1	0	0	0
Naturopathic Doctor	0	5	0	0
Naturopathic Physician	0	4	0	0
Ophthalmology	29	0	0	0
No Board certification	0	0	0	0
No Response	0	0	0	21

Abbreviations: MD, Doctor of Medicine; ND, Naturopathic Doctor; NP, Nurse Practitioner.

^aMultiple respondents reported more than one (1) board certification.

Table 14. Types of products used, prescribed, or recommended

Types of Products	Respondents, n (N=10^a)
Compounded	1
FDA-approved	5
Over-the-counter	1
Dietary	3
Unsure	1
No Response	2

^aOne (1) respondent reported use of more than one (1) type of product

Table 15. Compounded use of riboflavin 5'-phosphate sodium in practice

Indication	Strength	Dosing frequency	Dosage Form	ROA	Duration of Treatment	Patient population
“Many” ^a	–	–	–	–	–	–

^aQuotation direct words from the respondent.

Table 16. Indications for which riboflavin 5'-phosphate sodium is considered standard therapy^a

Indication ^b	Standard Therapy			
	Compounded, n (N=1)	Non-compounded, n (N=9 ^a)	Unsure, n (N=1)	No Response, n (N=2)
Angular cheilitis	0	1	0	0
Cross linking for keratoconus	0	4	1	0
“Cxl”	0	1	0	0
Fatigue	0	1	0	0
Infertility	0	1	0	0
“Many”	1	0	0	0
Menstrual issues	0	1	0	0
Migraines	0	2	0	0
Mitochondrial dysfunction	0	1	0	0
Nutrient deficiencies	0	1	0	0
Thyroid	0	1	0	0
No Response	0	0	0	2

^aMultiple respondents reported multiple indications in which riboflavin 5'-phosphate sodium is considered standard therapy.

^bQuotations are direct words from respondents.

Table 17. Reasons for using a compounded product instead of an FDA-approved product^a

Reasons
“Better”

^aQuotations are direct words from the respondents.

Table 18. Change in frequency of compounded riboflavin 5'-phosphate sodium over the past 5 years

	Respondents, n (N=1)
No - use has remained consistent	0
Yes - I use it LESS often now	0
Yes - I use it MORE often now	1 ^a

^aRespondent stated reasoning for change in frequency is due to being needed.

Table 19. Do you stock non-patient specific compounded riboflavin 5'-phosphate in your practice?

	Respondents, n (N=1)
No	0
Yes	1 ^a

^aRespondent reported stocking non-patient specific compounded riboflavin 5'-phosphate sodium obtained from a compounding pharmacy in a physician office for reasons of convenience.

Table 20. Questions related to stocking non-patient specific compounded products

No additional survey respondents provided this information; refer to table 19

CONCLUSION

Riboflavin 5' phosphate sodium was nominated for inclusion on the 503B Bulks List for use as a 0.1% - 0.25% ophthalmic preparation, with concentrations greater than 0.25% needed depending on the patient, to induce collagen cross-linking in the cornea to treat progressive keratoconus. Riboflavin 5' -phosphate sodium was also nominated for use as an immune boost, energy metabolism, vitamin deficiency, and migraines in a 2mg/mL-20mg/mL injection. Additionally, riboflavin 5' -phosphate sodium was nominated for use in riboflavin deficiency with enzymatic disorder, microcytic anemia, migraine, muscle cramp, and burning feet syndrome as a 2-100mg/mL IV and IM injection. Lastly, riboflavin 5' -phosphate sodium was nominated as a combination product for use in vitamin deficiency as a 50mg/mL IM injection, or per the prescribers' request.

Riboflavin 5' -phosphate sodium is FDA-approved for use in the US. Riboflavin 5' -phosphate sodium is available as a combination product for IV injection with other vitamins and minerals as well as an ophthalmic solution. Riboflavin 5' phosphate sodium is also available in various oral dosage forms as an OTC product and has a USP monograph. Riboflavin 5' -phosphate sodium is available as various combination products for IV and IM injection with other vitamins and minerals in Canada, the UK, Ireland, Belgium, Latvia, Australia, New Zealand, Saudi Arabia, Hong Kong, and Namibia. No ophthalmic products were identified.

No studies met the inclusion criteria for the literature review. No interviews were conducted. From the survey responses, one (1) respondent reported use of compounded riboflavin 5' -phosphate sodium for “many” indications because the compounded products are “better” than the commercially available

products. No information regarding dosage form or route of administration was provided by the survey respondent. The respondent reports using it more often due to an increase in need as well as stocking of non-patient specific compounded products obtained from a compounding pharmacy in a physician office for reasons of convenience.

APPENDICES

Appendix 1. References

1. O'Brart N, O'Brart D, Aldahlawi N, Hayes S, Meek K. An investigation of the effects of riboflavin concentration on the efficacy of corneal cross-linking using an enzymatic resistance model in porcine corneas. *Investig Ophthalmol Vis Sci.* 2018;59(2):1058-1065.

Appendix 2. Survey instrument

Start of Block: Welcome Page

The University of Maryland Center of Excellence in Regulatory Science and Innovation (M-CERSI), in collaboration with the Food and Drug Administration (FDA), is conducting research regarding the use of certain bulk drug substances nominated for use in compounding by outsourcing facilities under section 503B of the Federal Food, Drug, and Cosmetic Act. In particular, we are interested in the current and historic use of these substances in clinical practice. This survey is for **riboflavin 5'-phosphate sodium**. As a medical expert, we appreciate your input regarding the use of this substance in your clinical practice. This information will assist FDA in its development of a list of bulk drug substances that outsourcing facilities can use in compounding under section 503B of the Act. All responses are anonymous.

OMB Control No. 0910-0871

Expiration date: June 30, 2022

The time required to complete this information collection is estimated to average 30 minutes, including the time to review instructions, search existing data sources, gather the data needed, and complete and review the information collection. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. If you have additional questions or concerns about this research study, please email: compounding@rx.umaryland.edu. If you have questions about your rights as a research subject, please contact HRPO at 410-760-5037 or hrpo@umaryland.edu.

End of Block: Welcome Page

Start of Block: Riboflavin 5'-phosphate sodium

Q1. What type(s) of product(s) do you use, prescribe, or recommend for **riboflavin 5'-phosphate sodium**? Please check all that apply.

- Compounded drug product
- FDA-approved drug product
- Over the counter drug product
- Dietary supplement (e.g. vitamin or herbal supplement products sold in retail setting)
- Unsure

Skip To: Q13 If What type(s) of product(s) do you use, prescribe, or recommend for riboflavin 5'-phosphate sodium? Please check all th... != Compounded drug product

Skip To: Q2 If What type(s) of product(s) do you use, prescribe, or recommend for riboflavin 5'-phosphate sodium? Please check all th... = Compounded drug product

Display This Question:

If What type(s) of product(s) do you use, prescribe, or recommend for riboflavin 5'-phosphate sodium? Please check all th... = Compounded drug product

Q2. Please list any conditions or diseases for which you use compounded **riboflavin 5'-phosphate sodium** in your practice. Please include the strength(s), dosing frequency(ies), dosage form(s), route(s) of administration, duration of therapy, and patient population (ex. age, gender, comorbidities, allergies, etc).

	Strength(s) (please include units)	Dosing frequency(ies)	Dosage form(s)	Route(s) of administration	Duration of therapy	Patient population
Condition 1 (please describe)						
Condition 2 (please describe)						
Condition 3 (please describe)						
Condition 4 (please describe)						
Condition 5 (please describe)						

Q3. Do you use compounded **riboflavin 5'-phosphate sodium** as a single agent active ingredient or as one active ingredient in a combination product? Please check all that apply.

- Single
- Combination

Skip To: Q5 If Do you use compounded riboflavin 5'-phosphate sodium as a single agent active ingredient, or as one active ingredient... != Combination

Display This Question:

If Loop current: Do you use compounded riboflavin 5'-phosphate sodium as a single agent active ingredient, or as one active ingredient... = Combination

Q4. Please list all combination products in which you use compounded **riboflavin 5'-phosphate sodium**.

Q5. For which, if any, diseases or conditions do you consider compounded **riboflavin 5'-phosphate sodium** standard therapy?

Q6. Does your specialty describe the use of compounded **riboflavin 5'-phosphate sodium** in medical practice guidelines or other resources?

Q7. Over the past 5 years, has the frequency in which you have used compounded **riboflavin 5'-phosphate sodium** changed?

- Yes - I use it **MORE** often now (briefly describe why) _____
- Yes - I use it **LESS** often now (briefly describe why) _____
- No - use has remained consistent

Q8. Why do you use compounded **riboflavin 5'-phosphate sodium** instead of any FDA-approved drug product? _____

Q9. Do you stock non-patient-specific compounded **riboflavin 5'-phosphate sodium** in your practice location?

- Yes
- No

Skip To: End of Block If Do you stock non-patient-specific compounded riboflavin 5'-phosphate sodium in your practice location? = No

Display This Question:

If Do you stock non-patient-specific compounded riboflavin 5'-phosphate sodium in your practice location? = Yes

Q10. In what practice location(s) do you stock non-patient-specific compounded **riboflavin 5'-phosphate sodium**? Please check all that apply.

- Physician office
- Outpatient clinic
- Emergency room
- Operating room
- Inpatient ward
- Other (please describe) _____

Q11. How do you obtain your stock of non-patient-specific compounded **riboflavin 5'-phosphate sodium**? Please check all that apply.

- Purchase from a compounding pharmacy
- Purchase from an outsourcing facility
- Compound the product yourself
- Other (please describe) _____

Q12. Why do you keep a stock of non-patient-specific compounded **riboflavin 5'-phosphate sodium**? Please check all that apply.

- Convenience
- Emergencies
- Other (please describe) _____

Skip To: End of Block If Why do you keep a stock of non-patient-specific compounded riboflavin 5'-phosphate sodium? Please check all that apply. = Convenience

Skip To: End of Block If Why do you keep a stock of non-patient-specific compounded riboflavin 5'-phosphate sodium? Please check all that apply. = Emergencies

Skip To: End of Block If Why do you keep a stock of non-patient-specific compounded riboflavin 5'-phosphate sodium? Please check all that apply. = Other (please describe)

Q13. For which, if any, diseases or conditions do you consider **riboflavin 5'-phosphate sodium** standard therapy? _____

Q14. Does your specialty describe the use of **riboflavin 5'-phosphate sodium** in medical practice guidelines or other resources?

End of Block: Riboflavin 5'-phosphate sodium

Start of Block: Background Information

Q15. What is your terminal clinical degree? Please check all that apply.

- Doctor of Medicine (MD)
- Doctor of Osteopathic Medicine (DO)
- Doctor of Medicine in Dentistry (DMD/DDS)
- Naturopathic Doctor (ND)
- Nurse Practitioner (NP)
- Physician Assistant (PA)
- Other (please describe) _____

Q16. Which of the following Board certification(s) do you hold? Please check all that apply.

- No Board certification
- Allergy and Immunology
- Anesthesiology
- Cardiovascular Disease
- Critical Care Medicine
- Dermatology
- Emergency Medicine
- Endocrinology, Diabetes and Metabolism
- Family Medicine
- Gastroenterology
- Hematology
- Infectious Disease
- Internal Medicine
- Medical Toxicology
- Naturopathic Doctor
- Naturopathic Physician
- Nephrology
- Neurology
- Obstetrics and Gynecology
- Oncology
- Ophthalmology
- Otolaryngology
- Pain Medicine
- Pediatrics
- Psychiatry
- Rheumatology
- Sleep Medicine
- Surgery (please describe) _____
- Urology
- Other (please describe) _____

End of Block: Background Information