

# Calcium Folate (ImmunoPterin) Dietary Supplement – An Update

**Phillip B. Berkey Moheno, Ph.D.**
**SanRx Pharmaceuticals, Inc.**

## NCI Summary

## November 1, 2016

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**SanRx Pharmaceuticals, Inc.**

**Moheno PBB. Observational Study of Calcium Folate.**
***Open Science Journal of Pharmacy and Pharmacology*. 2014; 2: 14-8.**

***Ad libitum* 25-76 mg of CaFolate (300-900 µg folic acid equivalent) orally per day**,

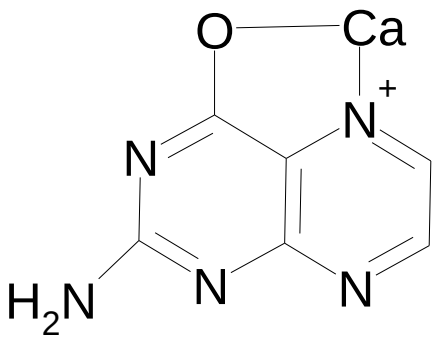
**Reported and determined efficacies:**

- **no flu/colds (>20/20 reporting none during the cold and flu season);**
- **greater energy/stamina (8/8 reporting increased);**
- **less osteoarthritis pain (10/11 reporting improvement);**
- **diminished mouth sores due to chemotherapy (2/2 reporting significant clearance), and**
- **cancer remissions (4/5 reported plus 1 transient improvement in a terminal case).**

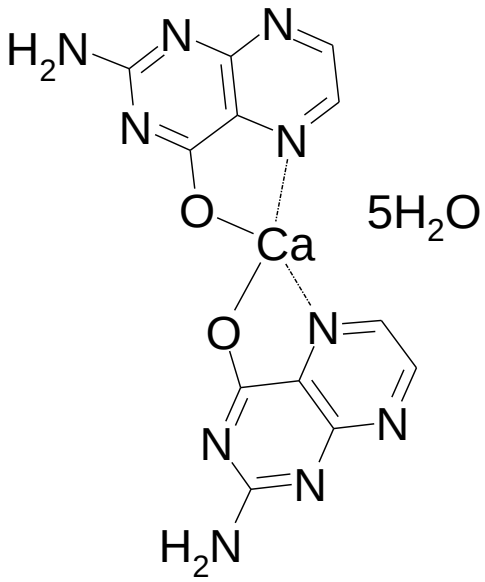
**These observational findings identify certain clinical endpoints for future matched group, randomized, double-blind, placebo-controlled clinical trials. One such clinical trial is underway in osteoarthritis.**

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# First Calcium Pterin Oral Immunotherapies



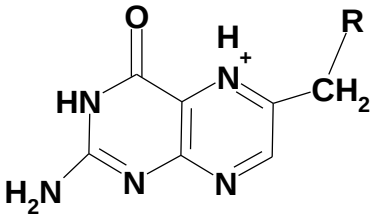

CaPterin™




Dipterinyl Calcium Pentahydrate (DCP™)

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# Calcium folate chemistry

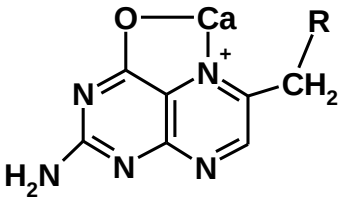


R = *p*-amino-benzoyl calcium glutamate

Folic Acid

+ 250 mol excess $CaCl_2.2H_2O$

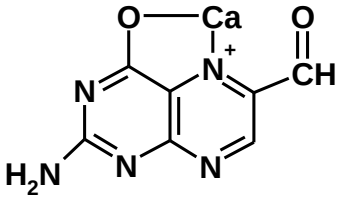
aqueous



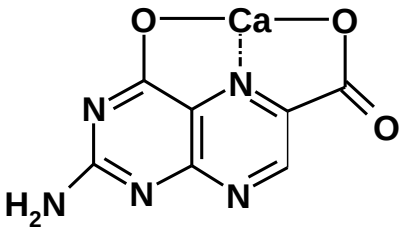
R = p-amino-benzoyl calcium glutamate

**Calcium Folate chelate**

pABG

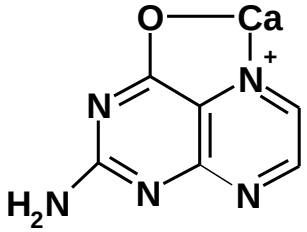


**Calcium Pterin-6-aldehyde chelate**



**Calcium Pterin-6-carboxylic acid chelate**

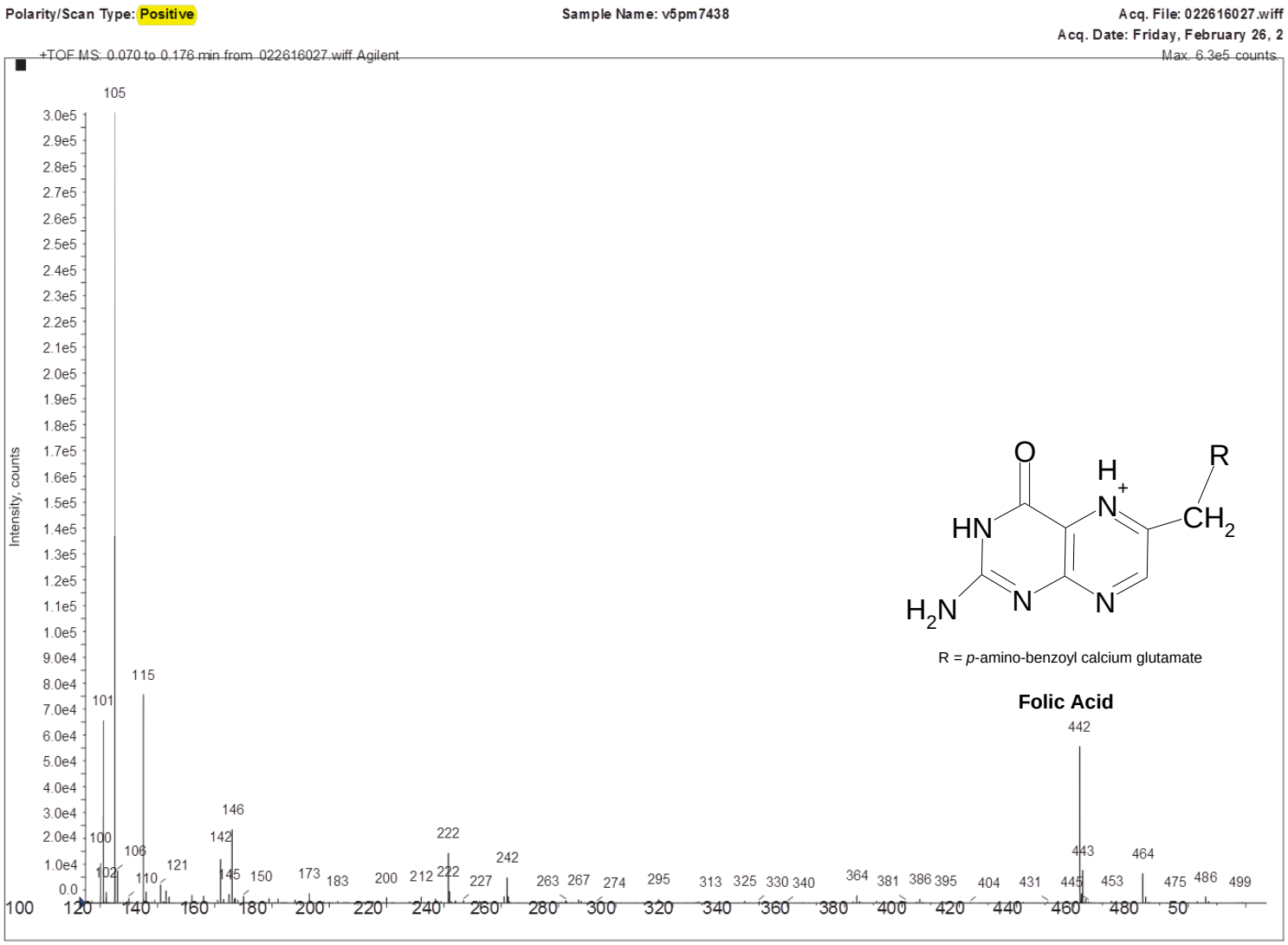
Does not go!



**Calcium Pterin chelate**

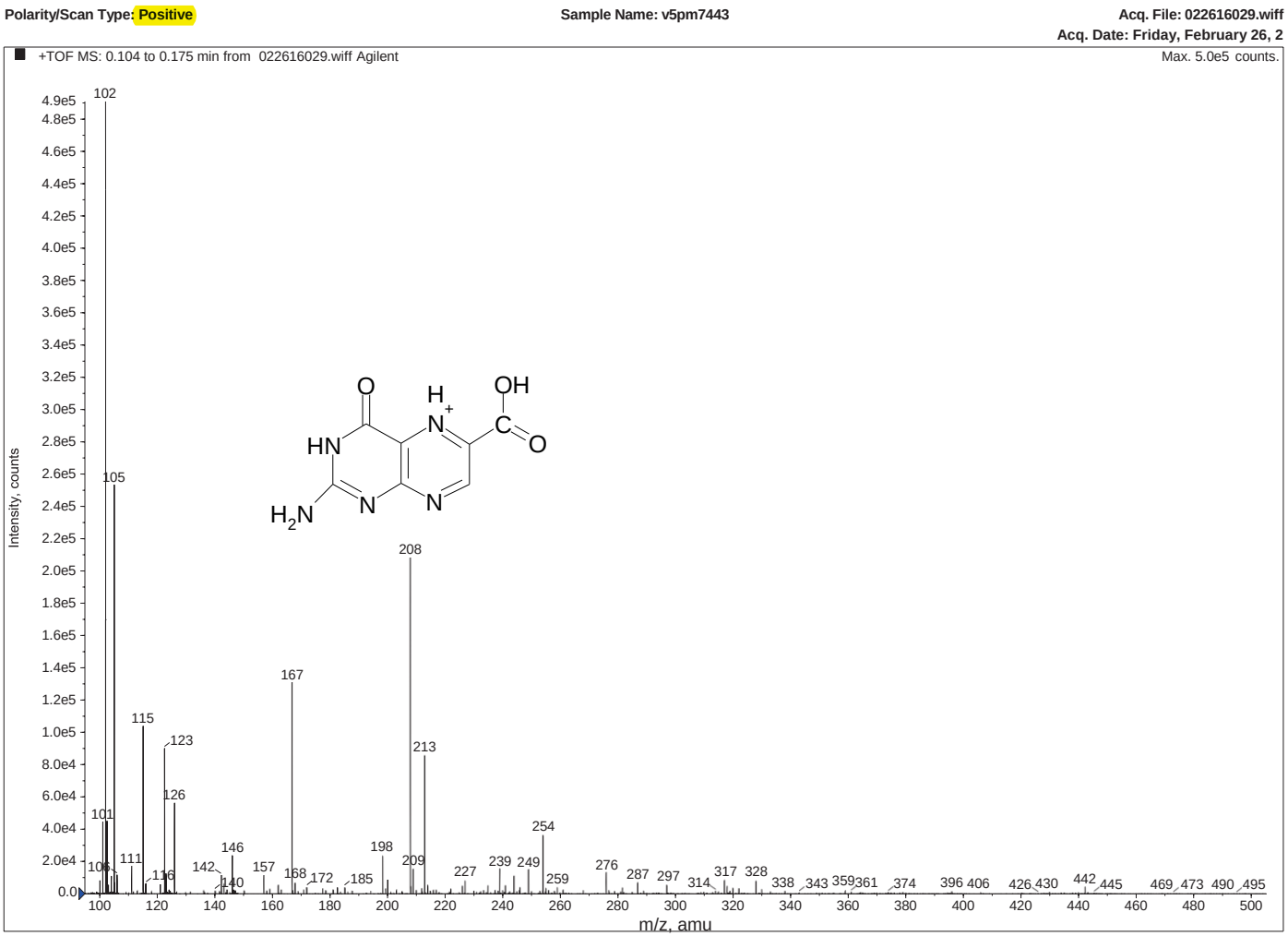
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# Mass Spec of folic acid (aq)

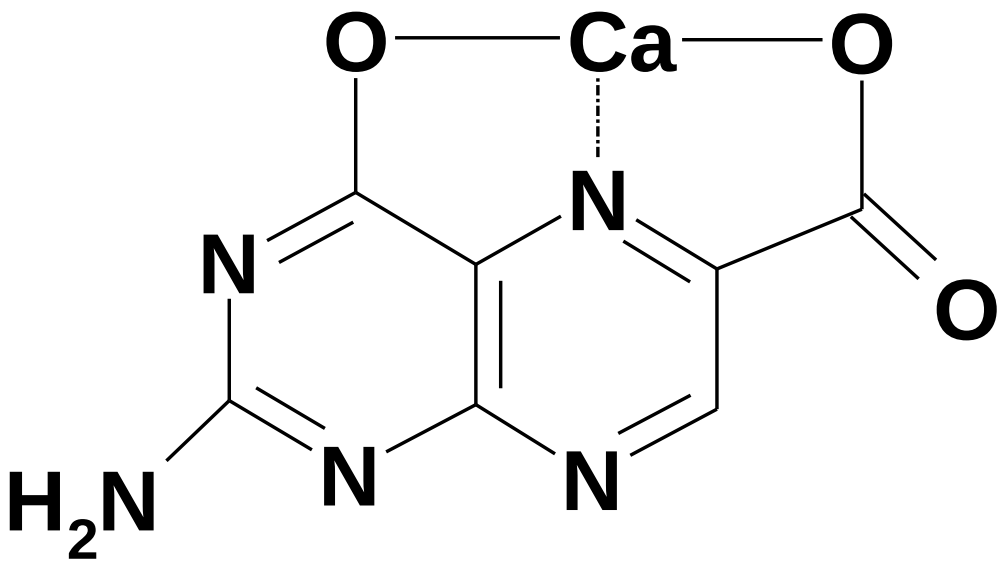


# Mass Spec of Folic Acid + excess $CaCl_2 \cdot 2H_2O$ (aq)

C-18 reverse-phase HPLC with dual phase elution of 1) 0.1% formic acid, and 2) acetonitrile + 0.1% formic acid



# Calcium Folate Active Ingredient




**Calcium Pterin-6-carboxylic acid chelate**

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# Summary of calcium folate (ImmunoPterin) clinical evidence

| Number of CaFolate Users Reporting (N) | Condition | Reported Positive Efficacy with CaFolate |
|---|---|---|
| >20 | Flu/colds (during cold/flu season) | 100% |
| 8 | Energy/Stamina | 100% |
| 11 | Arthritis | 91% |
| 2 | Chemo Mouth Sores | 100% |
| 1 | Lupus erythematosus | 100% |
| 1 | Leg Pain | 100% |
| 1 | Hepatitis C | Remission |
| 2 | Type 2 diabetes | Stabilized |
| 1 | Bladder CA (tumor) | Remission |
| 1 | Skin CA lesions | Remission |
| 1 | Brain CA (terminal) | Increased apatite |
| 1 | Kidney CA (tumor) | Remission |
| 1 | Breast CA with bone metastasis | Remission |
| 1 | Mononucleosis/Lyme Disease | Inconclusive |
| 1 | Lyme Disease | Induced inflammatory response |
| 1 | Gastroenteritis | Mitigated |

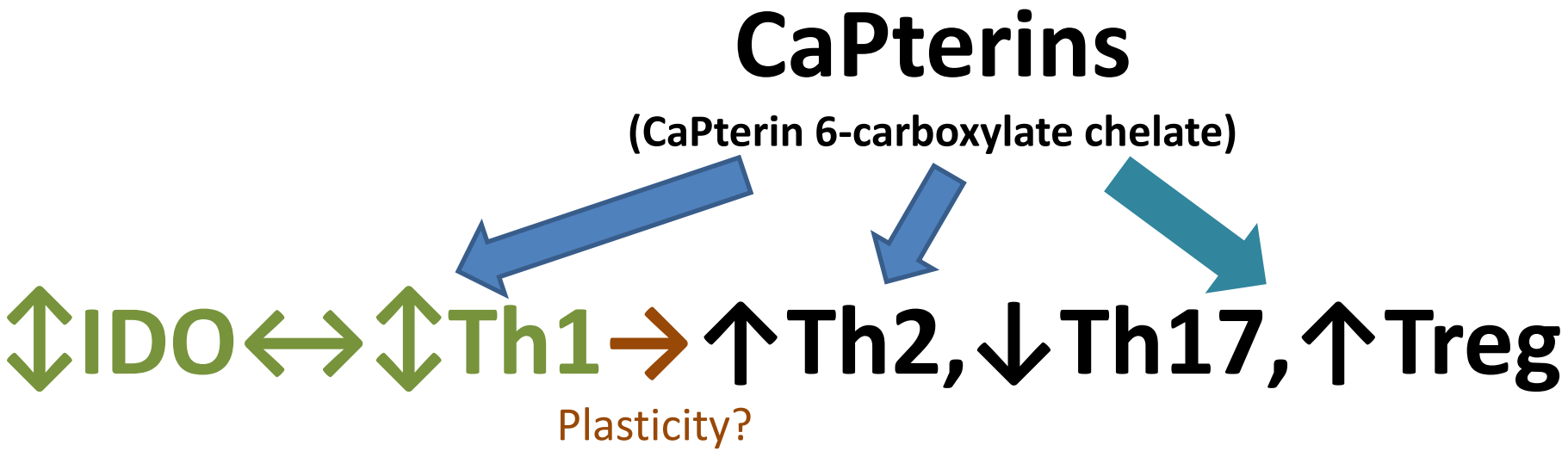
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| Indication [references] | High/Low IDO from affliction | High/Low Cytokines / from affliction | Efficacious Dose Range (mg/kg) | Δ Th1/Th2/Th17 and/or IDO from affliction |
|---|---|---|---|---|
| ***In human*** | | | CaPte6CC† | |
| Colds/influenza | ↑IDO [1, 2] | Complex,↑Treg→↑IL-10 [8] | 0.007 | ↑Th1,↑Th2,↑Th17, ↕Treg [8, 12],↑IDO |
| Tuberculosis | ↑IDO [3, 4] | Complex,↑Treg→↑IL-10 [9] | N/A | ↓Th1,↕Th2,↓Th17,↑Th22, ↑Treg [13, 14],↑IDO |
| Cancer (various) | ↑IDO [5, 6] | Complex,↑IL-6 [10] | 0.007 | ↓Th1,↑Th2,↑Th17,↑Treg [15-18],↑IDO |
| Osteoarthritis | ↑IDO [7] | ↑IL-6 [11] | 0.002 | ↑Th1,↑Th2,↑Th17 [19],↑IDO |
| **Efficacy Model** | **Δ IDO from efficacious treatment** | **Δ Cytokines from efficacious treatment** | **Efficacious Dose Range (mg/kg)** | **Δ Th1/Th2/Treg and/or Δ IDO from @ efficacious dosages** |
| ***In vivo*** MDA-MBA-231 nude mice [20-22] | ↑ kynurenine | ↓IFNγ,↑IL-12→↕Th1→↓IFNγ ↑IL-4→↑Th2: ↑IL-4 ↑Treg→↑IL-10 ↓IL-6→↓Th17 [23] | 7 - 69 CaPterin, DCP | ↕Th1,↑Th2,↑Treg, ↓Th17 ↑IDO |
| ***In vivo*** Hepatitis B virus transgenic mice [24] | ↓ kyn/trp | ↑GM-CSF,↓MCP-1 | 23 DCP | ↓IDO |
| ***In vivo d***iet-induced obese (DIO) mice [25] | No Change | ↓IL-6*,↑NO*,** | 7 DCP | No Significant Change |
| ***In vitro*** Tuberculosis *Mycobacterium* [26] | ↓20-fold of IDO mRNA | ↑MIP-1β,↑NO, ↑IL-12,↑GM-CSF | 500 mg/kg (eqv) DCP | ↓IDO |
| ***In vitro assay*** [27] PBMCs | ↑IDO* (@14mg/kg) ↓IDO (@140mg/ml) | N/A | 14 – 140 CaPterin | @14mg/kg: ↑IDO* @140mg/ml: ↓IDO |

* From compelling data trend; ** Personally communicated data; † Calcium pterin 6-carboxylate chelate

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# Hypothesized Efficacious Mechanism of Action (Nude Mouse Tumor Model)




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# SanRx Team



Edgar Berkey



Phillip B. Berkey Moheno

- Highly experienced Scientific Team
  - 100+ combined years experience in biochemistry, applied research, IP
- Scientific Advisory Board
  - United States, Austria, Germany
- Business Advisory Board
  - Business development, finance, marketing, nutraceutical

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# Scientific Advisors

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**Stephen Chang, Ph.D. – SanRx Consultant**
**Boris Minev MD – Director of Tumor Immunology, UCSD Moores Cancer Center**
**James C. Ryan Ph.D. - UC San Francisco, Immunology**
**Wolfgang Pfleiderer Ph.D. – Prof. of Chemistry, Univ. of Stuttgart and Konstanz in Germany**
**Arnold L. Rheingold Ph.D. - UC San Diego, Chemistry & Biochemistry**
**Antonio G. DiPasquale Ph.D. - UC Berkeley, Chemistry & Biochemistry**
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**Daniel F. Hoft MD Ph.D. – Saint Louis Univ., Immunobiology, Internal Medicine, & Microbiology**
**Svetlana Nikoulina Ph.D. – Director of Preclinical Research & Development, SanRx**

**For further details visit www.sanrx.com and www.immunopterin.com .**

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