OCTOBER 2021 | VOLUME 7 | ISSUE 5

SLMNA NEWSLETTER

SRI LANKA MEDICAL NUTRITION ASSOCIATION OFFICIAL NEWSLETTER

Linking nutrition research to practice...

EDITOR'S NOTE

The oceans are one of earth's greatest gifts to human beings, beautiful and valuable ecosystems teeming with life that provide everything from fresh food to career opportunities for millions of people. Marine resources like minerals, oil and marine life and the seafood supplies meet a substantial food requirement of the world's population. The marine species and the aquatic habitats in which they reside have become endangered and extinct, as the pollution is being constantly pumped out into these water resources. These large bodies of water that we are so dependent on are like a slowly wilting flower that has been beaten down over the years and is now shedding its last petals. Since these oceans are essential to the existence of every creature on this planet, conservation of marine life is considered so important. Marine life conservation helps to save these irreplaceable species that make lives easier each and every day.

Udari and Hasanthi ...

Until the last meetup of the year 2021

THIS MONTH'S FEATURED ARTICLES

- Capture of the Month - Vitamin K in Food and Warfarin
- Food of the Month - Marine Fish
- Past and Upcoming Events

CAPTURE OF THE MONTH

The Ocean is not Our Dump !

ARTICLE OF THE MONTH

A case study

Vitamin K in Food and Warfarin

BY. DR. PEARL MALLAWAARACHCHI

While I was doing the cardiology appointment I learnt there are different types of food that contain large amount of vitamin K that interact with warfarin. As triple therapy warfarin is given to patients with valvular heart disease and atrial fibrillation. I knew the green leafy vegetables contain exceptionally high amount of vitamin K. The oral nutritional supplements (ONS) are high in vitamin K. If a patient takes around 1l of ONS, it can exceed the daily requirement of vitamin K. Before I start the cardiology appointment I did not consider much about the vitamin K content of food when prescribing nutrition plans. But during the appointment I was very careful in prescribing food and ONS.

From literature review I found patients can consume a consistent amount of vitamin K containing food while on warfarin therapy. Dietary recommendation is 60-85µg/d of vitamin K, is the acceptable amount for these patients. Recommended dietary allowance to healthy person is 90-120µg/d.

This was a history I took during the appointment with complicated heart disease.

A 38 year male with ASD and correction done 19 years back. He was said further correction of remaining valvular lesions impossible due to life threatening condition and now having complicated cardiac problems.

He was diagnosed to have pulmonary hypertension, grade 3 mitral regurgitation, atrial fibrillation and cardiac cirrhosis currently developed hepatorenal syndrome. He had a history of recurrent hospital admissions.

He developed shortness of breath while walking more than 10 feet. He developed bleeding patches on D4 of admission with INR of 4.9 and warfarin dose was reduced, later it was withheld and INR became 2.8.

His diet did not contain vitamin K containing food and he was asked not to eat green leafy and green colour vegetables. His vitamin and mineral supplementation did not contain vitamin K.

He was prescribed a nutrition plan. As he was having SAM calories calculated as 40kcal/kg/d. because his S. creatinine was high and found to have low GFR (stage 3b) protein kept at 0.8g/kg/d. To supplement essential fatty acids small fish encouraged and divided in meals to increase bioavailability of non heame iron. Added small amount of soya oil to supplement omega 6, though it contains vitamin K (183µg/100g). To balance the diet with MUFA and supplement calories olive oil also added which is 13g(1tbs) having 10% RDA of vitamin K. Asked to continue consistent amount of above oil while in ward as he was on INR monitoring. I searched foods high in vitamin K and educated about them to the patient.

To supplement energy, low protein renal ONS used without restricting his functional food. The ONS I used was very low in vitamin K and which does not make an impact on his warfarin dose. But 2 days later patient was has developed loss of appetite and food intake is reduced. Then standard polymeric formula also added keeping vitamin K delivery in safe limits. While I was searching for vitamin K content in ONS, I found some of them are high in vitamin K, eg: Isocal, Pentasure 2.0.

He was getting almost all the micronutrients from his Zincovit, Anemidox and ONS. Therefore further micronutrients are not added for the moment.

Patient was educated on the importance of possible resistant exercise following discharge to improve muscle function. But the next day the patient developed haemodynamic instability and later he was intubated and sent to ICU.

I discussed the nutritional management of the patient with other medical officers who were undergoing training for family medicine, elderly medicine diplomas. They were so interested in nutritional management and requested me to do a class on nutrition in patients with cardiovascular disease. I searched more on the topic and did the class.

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FOOD OF THE MONTH

MARINE FISH

THE NUTRITIOUS GIFT FROM THE SEA

BY DR. CHANDRA AGALAWATTA

Sri Lanka is surrounded by the Indian Ocean and has an exclusive economic zone (EEZ) of 517,000 km2, which is rich in varieties of fish species. Total annual fish production was 505,830 MT including marine, inland and aquaculture sectors in 2019. Of that, the main contribution was from the marine sector with 82.1% of the total. Per capita consumption of fish in Sri Lanka was 45.4g/day and 16.6 kg/year in 2019 (MFAR 2020).

Role of Marine Fish in Sri Lankan Food Plate

Seafood, particularly fish, is contributing to play a critical role in global food and nutrition security due to its nutrition-dense quality, especially in low and middle-income countries like Sri Lanka, where there is high prevalence of malnutrition and micronutrient deficiencies. Even a small quantity of fish included in the diet will provide a wide range of nutrients in a culture where the staple food is based on grains or tubers, like ours. Since fish is low cost and easily available it provides diversification in diet especially in the low-income class. Fish is a rich source of essential nutrients that are high in bioavailability. The main nutrients include are;

Protein: Every aspect of physiology involves proteins. It acts as a major structural element in all cells, involves to catalyze every chemical reaction in the body, regulates gene expression, is involved in immunity, and is the main constituent of muscle. Individual amino acids also function as neurotransmitters, hormones, and modulators in many physiological processes. Fish contributes to 50% of the total protein of animal origin in the Sri Lankan diet.

Long-chain polyunsaturated fatty acids (LCPUFA): Mainly eicosapentaenoic and docosahexaenoic acids. It slows brain ageing, improves memory and cognitive functions. LCPUFA is essential for optimal development of the fetus and infant.

Vitamins (D, B12, A and E): Needed for bone health; nucleic acids synthesis, red blood cell and neurological function; maintenance of vision and respiratory tract; and for antioxidant defense respectively.

Minerals (Iron, calcium, iodine, zinc and selenium): Important for every physiological reaction. Plays key roles in oxygen-carrying in Haemoglobin, maintaining healthy bones and teeth, making thyroid hormone, maintaining the immune system.

Beyond its nutritional values fish plays an important role as a functional food, influencing positive effects on health such as improving physical and mental health and reducing the risk of diseases such as heart disease, diabetics, cancer, dementia, osteoporosis, psoriasis, lupus, arthritis, retinopathy, and other chronic and inflammatory diseases.

Pattern of Fish Consumption in Sri Lanka

Among fresh fish,

Large fish -Skipjack tuna (Balaya), Yellowfin tuna (Kelawalla), Trevallies (Paraw) and Sail fish (Thalapath)

Small fish - Goldstripe sardinella (Salaya), Trenched sardinella (Hurulla) and Shortfin scad (Linna)

Dried fish – Anchovys (Halmassa), Smoothbelly sardinells (Keeramin), Queen fish (Katta), Skipjack tuna(Balaya) and Sharks(Mora/Keelan) are the popular varieties(MFAR 2020).

Yellowfintuna (Thunnus albacares), swordfish (Xiphias gladius), skipjack tuna (Katsuwonus pelamis) and marlin (Makira sp.) are the most important export fishes in Sri Lanka and provides a significant input to foreign earnings.

Nutrition Composition - Small Fish vs. Large Fish

Nutritional variance observed in marine fish is mainly due to habitation, region, season and edible parts. Small fish are consumed in whole with skin, bones and viscera, in large fish, only the filet is consumed.

Since different nutrients are concentrated more in certain tissues (Eg: Liver-Iron, Head-essential fatty acids, Skin-zinc and Eyes- vitamin A) eating small fish as a whole will be more nutrient-dense than that of large fish. For example, small fish like Leiognathus dussumieri (Karalla/Ponyfish), provides more than 25% of the recommended nutrient intake of a woman of reproductive age for several essential nutrients. When considering the nutrition types, small fish species are significantly higher in the amount of LCPUFA (both EPA and DHA), minerals especially calcium, iron and zinc, and vitamins such as vitamin A. The mean protein content for small and large fish is almost equal (19g/100g and 20/100g).

Sea Pollution and Marine Ecosystem

The pollution of marine ecosystems is a worldwide problem due to rapid urbanization and industrialization, using coastal areas and the sea as a region of dumping waste. Hence apart from being nutritious fish can act as a main source of contaminants from the sea, such as heavy metals, organic pollutants, and plastics, to the plate. These ecosystems can biomagnifies heavy metals such as mercury(Hg), lead(Pd) and cadmium(Cd), within food chains. Mercury has drawn global attention after the Minamata incidence in Japan(1953), due to its highly toxic nature, long stay (for decades and centuries) in the environment once it's released to the mercury cycle and distance travelling from the dumping site. The main sources of Hg emission are natural(10%), anthropogenic activities(30%)- small scale gold mining (37%) and vinyl chloride production(26%), and re-emission (60%).

Let's Consume Fish Wisely

Methyl mercury is the most toxic, which contributes 90% of the mercury in fish. Large predator fish species like swordfish, yellowfin tuna and sharks on top of the food chain accumulate Hg more in their bodies. In Sri Lankan hair studies at Negombo and Kalpitiya Peninsula and the Puttalam lagoon areas, the estimated hair Hg levels appear to exceed normal reference levels (1ppm). A positive correlation with predator fish consumption has been identified in this population. It will be valuable that the public is aware of the fact that almost all of our marine small fish appear to be safe to consume liberally while some of the predator fish needed to consume cautiously in estimated amounts to avoid Hg toxicity (Table 1).

The safe level for mercury in food is described by provisional tolerable weekly intake (PTWI) set by 'The Joint FAO/WHO Expert Committee on Food Additives (JECFA)'.

The Committee established PTWI is 5 µg/kg body weight (BW) for total mercury. A level of 0.5 mg/kg wet weight(W/W) maximum limit for MeHg in fish has been established by the Codex Alimentarius Commission.

The export fishery in Sri Lanka strictly follows the regulations by the European Commission (EU/EC-1881, 2006) and the Sri Lanka export regulation of fish in GOSL (1528/7, 1996) for maximum limits for total Hg for fish and fishery products. Accordingly, the maximum Hg level on a W/W basis is 1 mg/kg for yellowfin tuna (YFT) and swordfish (SWF), and 0.5 mg/kg for sardinella (SAF). FOOD ACT No.26 of 1980 by the ministry of health declares that fresh, chilled and frozen fish should not contain more than 1mg/Kg mercury. For canned, dried/salted, Maldive, smoked and comminuted fish products the upper level is 0.5mg/Kg.

It has revealed that trimming, cooking (boiling and frying) and skinning cannot remove mercury deposited in fish. Moreover the high temperature used in cooking methods reduces the volatile character of MeHg. However, the bio accessibility of Hg is reducing up to 40-60% to that of raw fish after cooking. The effect of Sri Lankan cooking methods is yet to be studied.

Hg levels can be estimated through urine, saliva, serum, blood, breast milk and other tissues (hair, body fat and teeth). Hair analysis is a relatively low-cost method that would reflect information in long term exposure to Hg.

Marine fish			Known Mercury content of Sri Lankan capture (mg/Kg W.W.)[1]		PTWI (g/W)[2]	Reference
Name in English	Name in Sinhala	Scientific Name	Sri Lankan Studies	Other country studies[3]		
Barramundi	Modha	*Lates calcarifer*		0.532(0.233-0.905)	563	1
Bay whiting	NF[4]	*Sillago ingenuua*	0.019±0.004		Safe[5]	15
Bigeye scade	Asgedi bolla	*Selar crumenophthalamus*	0.061±0.022		4918	15
Bigeye snapper	Hunu ranna	*Lutjanus lutjanus*	0.150±0.026		2000	15
Bigeye thresher shark	NF[4]	*Alopias superciliosus*		0.514±0.187	583	21
Bigeye tuna	Asgedi kelawalla	*Thunnus obesus*		0.201,0.339±0.291	1492	21
Black Marlin	Koppara	*Makariya indika*	0.49±0.37		612	9
Bombay duck	NF[4]	*Harpadon nehereus*		0.005±0.001	Safe[5]	15
Cheeckred snapper	Thabalaya	*lutjanus sp*	0.17(0.09-0.28)		1764	7
Copper shark	NF[4]	*Carcharhinus brachyurus*		0.251±0.128	1195	21
Delagoa threadfin bream	Sudhdhaa	*Nemipterus bipunctatus*	0.048±0.015		Safe[5]	15
Devis' Anchovy	Halmessa	*Encrasicholina devisi*	0.015±0.001		Safe[5]	15
Dussumier's ponyfish	Karalla	*Leiognathus dussumieri*	0.034±0.003		Safe[5]	15
Figate tuna	Alagoduwa	*Auxis thazard*	0.005±0.001	0.064±0.042	Safe[5]	15,7
Fringescale sardinella	Gal salaya	*Sardinella fimbriata*		0.017±0.000	Safe[5]	15
Goldstripe Sadinella	Matta Salaya	*Sardinella gibbosa*		0.01±0.01	Safe[5]	20
Indian Anchovy	Handalla	*Stolephorus indicus*	0.025±0.002		Safe[5]	15
Indian Mackeral	Kumbalawa	*Rastrelliger kanagurta*	0.003±0.001	0.038±0.008	Safe[5]	15
Indian oil Sardine	Pesalaya, Yaksalaya	*Sardinella longiceps*		0.001	Safe[5]	14
Kawakawa	Atawalla	*Euthynnus affinis*		0.063±0.016	4761	21
Longfin mojarra	NF[4]	*Pentaprion longimanus*		0.016±0.001	Safe[5]	15
Longhead Emperor	Uru hota	*Lethrinus olivaceus*	0.180±0.156		1666	15
Mangrove red snapper	Thabalaya	*Lutjanus argentimaculatus*		0.856(0.317-0.950)	350	1
Spanish Mackeral	Ahin Thora	*Scomberomorus commersoni*		0.368(0.159-0.983)	815	1
Oragefin ponyfish	Karalla	*Photopectoralis bindus*	0.007±0.007		Safe[5]	15
Painted sweetlips	Gobaya	*Diagramma pictum*	0.094±0.016		3191	15
Pickhandle Barrakudas	Jeelawa/Silava	*Sphyraena jello*	0.347±0.032		864	15
Sailfish	Thalapath	*Istiophorus platypterus*	0.25		1200	8
Short fin scad	Linna	*Decapterus macrosoma*	0.03±0.001		Safe[5]	15
Silky shark	Honda mora	*Carcharhinus falciformis*		0.122±0.035, 0.339±0.291	2459	21
Skipjack tuna	Balaya	*Katsuwonus pelamis*	0.13	0.110±0.153, 0.205±0.112	2307	14,21
Slender Pony fish	Karalla	*Equulites elongatus*	0.017±0.001		Safe[5]	15
Slender ranibow sardine	NF[4]	*Dussumieria elopsoides*		0.017±0.003	Safe[5]	15
Spangled emperor	Pulli Meewetiya	*Lethrinus nebulosus*		0.003±0.001	Safe[5]	18
Spinycheek lanternfish	NF[4]	*Benthosema fibulatum*		0.010±0.001	Safe[5]	15
Spotted Sardinella	Hurulla	*Amblygaster sirm*	0.012±0.002		Safe[5]	15
String rays	Welli maduva	*Dasyatis sp.*		0.548(0.233-0.905)	547	1
Swardfish	Sappara	*Xiphias gladius*	0.9±0.52, 1.24(0.20-2.58)	0.478±0.416, 0.987±0.446	241	6, 7,9,21
Tille trevally	Parawa	*Caranx tille*		0.886±0.104	338	21
Torpedo scad	Giralava	*Megalaspis cordyla*		0.058±0.009	Safe[5]	15
Trevalli	Thumba Parawa	*Carangoides fulvoguttatus*	0.035±0.004		Safe[5]	15
Unicorn cod	NF[4]	*Bregmaceros mcclellandi*		0.004±0.000	Safe[5]	15
Yellowfin Tuna	Kelawalla	*Thunnua albacares*	0.3±0.18, 0.39(0.14-0.88)	0.092±0.032, 0.375±0.166	769	6,7,9,21

1.W.W.- wet weight, 2.Other country studies- from indian ocean fish , 3.PTWI- calculated to adult body weight 60kg and 5 µg/kg BW, 4.NF- Not found, 5.Safe- If PTWI is more than 5000g/Week

Table: Mercury content of commonly consumed Marine fish in Sri Lanka

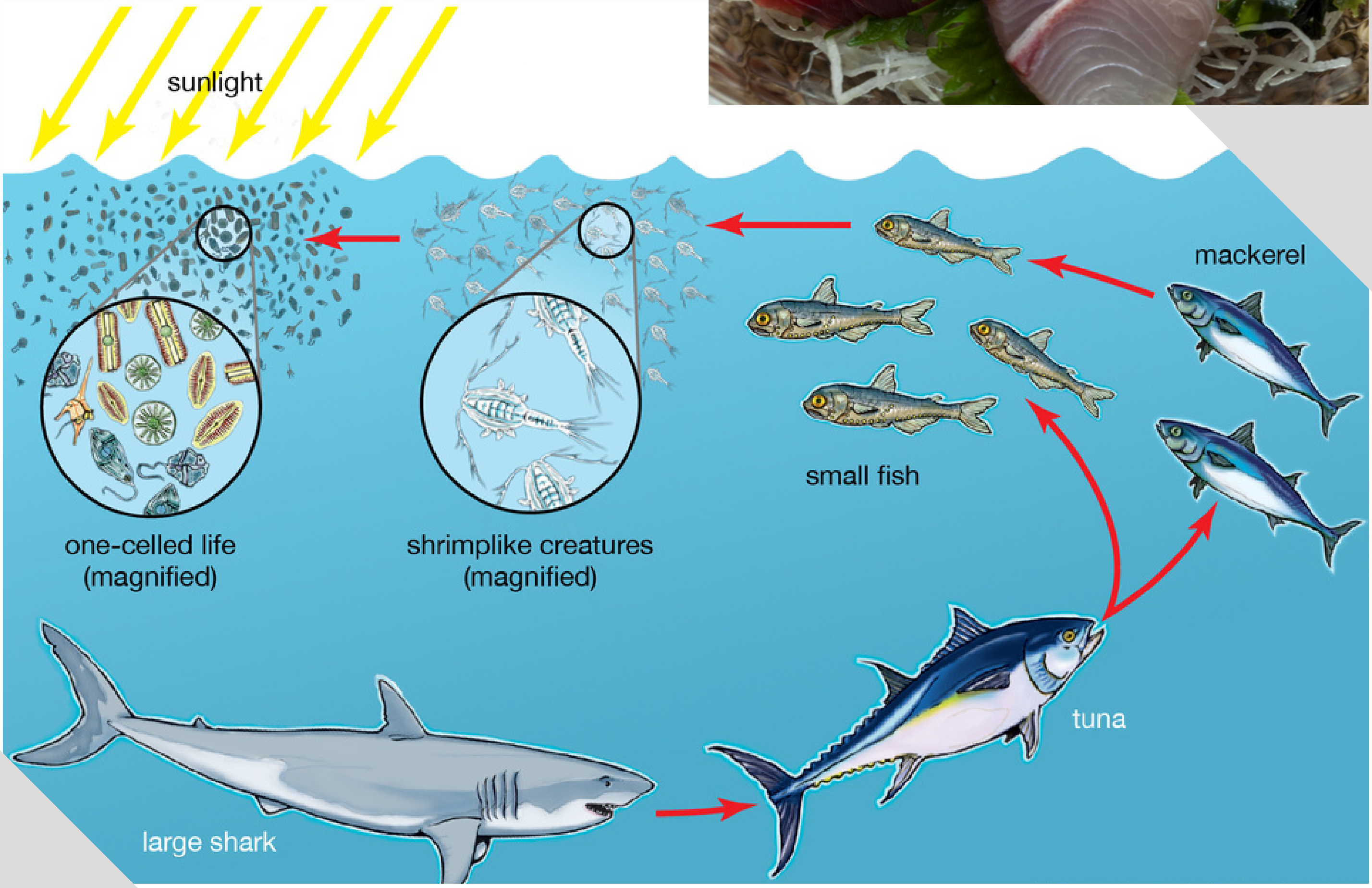
Act Together to Protect Marine Ecosystem

Methyl mercury crosses the blood placental barrier 10 times efficiently. It is excreted in breast milk. Hence fetuses and young children are the most at risk group. Toxicity can exhibits as neurological and behavioral disorders, pulmonary fibrosis, blood pressure effects and proteinuria. Overall cancer risk was found to be high with chronic exposure.

Food and Agriculture Organisation (FAO)/World Health Organisation (WHO), JECFA, EU/EC and Minamata Convention are the active global organizations addressing this situation. Their aim is to act upon reducing the Hg emission by adhering to mercury-free products/ techniques and proper hazardous waste disposal (Eg:fluorescent bulbs, batteries). Sri Lanka has signed Minamata Convention in 2014. The National Aquatic Resources Research and Development Agency (NARA) and Sri Lanka standards institute (SLSI) are the responsible organizations in Sri Lanka.

Key Take Home Messages

- Fish is a highly nutrition-dense, inexpensive food item.
- Small fish provide a significantly higher amount of fatty acid (DHA and EPA), vitamins and minerals whereas protein being near equal to large fish.
- Fish at bottom of the food chain (Eg:Anchovy, pony fish) can be consumed liberally, while predator fish at top of the food chain (Eg:Sword fish, Tille trevally) should be consumed cautiously within the PTWI level to avoid health hazards by Hg and other heavy metals.



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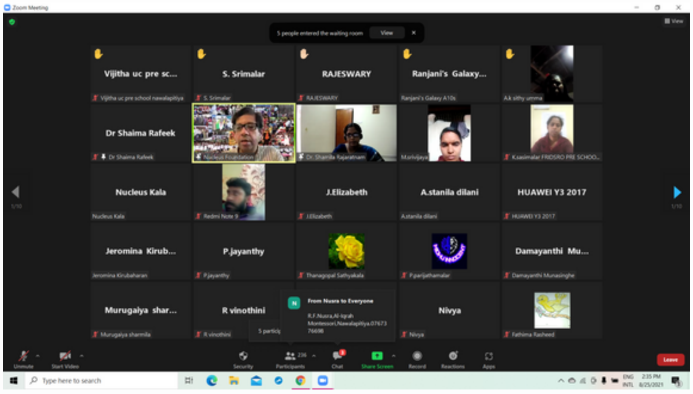
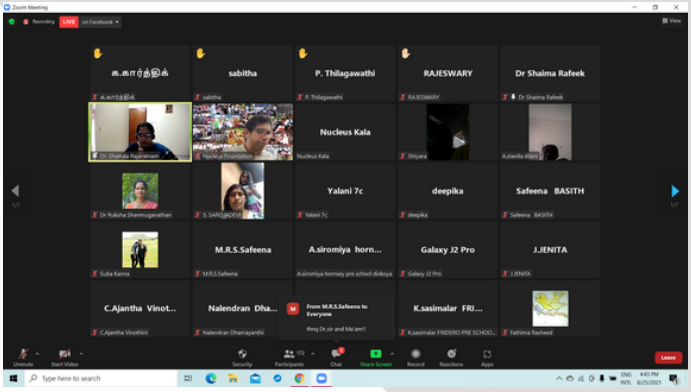
PAST EVENTS AND PUBLICATIONS

01 Health Education Program

SLMNA together with the Nucleus Foundation and ECD unit of Central Province, organized and successfully completed, a health education program for preschool teachers in Matale, Nuwaraeliya, Badulla, and Moneragala Districts.

The sessions were conducted virtually both in Sinhala and Tamil languages.





02 Research Workshop

SLMNA research workshop was conducted successfully as three virtual sessions. It was supervised and conducted by Prof. Upul Senarath, Professor of Community Medicine, Specialist in Community Medicine, Faculty of Medicine, University of Colombo

UPCOMING EVENTS

01. Low Salt Cooking Challenge - National event - Grand Finale

02. Annual Academic Sessions 2021

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