AYURLOG

National Journal of Research in Ayurved Science

http://www.ayurlog.com April- June: 2021|Volume: 09th |Issue: 2nd ISSN: 2320-7329

A review of role of Rajanyadi Churna as potential immune-modulator in Kaumarabhritya

Sreeja Pillai*[1], Hemant Paradkar[2], Anaya Pathrikar[3],
[1]PG Scholar , [2]Asso Professor, [3]Professor & HOD

Dept of Kayachikitsa, Sion Ayurved Mahavidyalaya, Mumbai, Maharashtra
*Corresponding author: drpuchy14@gmail.com

ABSTRACT:
The present pandemic situation has alarmed mankind to formulate and implement effective and practical tools to defend and confront any unexpected breakout of infectious diseases. It emphasizes the need to correct and sharpen the innate immune mechanisms, particularly under the circumstances of long waiting periods and uncertainty with vaccines. Revisiting the Ayurvedic principle of *agni* and *bala* to correct and enhance innate defence mechanisms in ways that can make the body ready to defend any situation of challenge. The paper explores the possibilities of the use of *Rajanyadi Churna* in *Kaumarabhritya.*

Keywords: *Rajanyadi Choornam, Immunomodulator*

INTRODUCTION

Immune modulators are a class of drugs that help to activate, boost or restore normal immune function when the immune system in the host is compromised.(1)

Adapting wholesome, natural immune correction and enhancement overcomes drawbacks of synthetic *immunomodulators* like *myelosuppression*(2). *Ayurveda* include *Baala* chikitsa as one of the *Ashta angas* and has given the scientific guidelines for the regulation of child immunity, right from conception to ensure right nutrition with clear channels of assimilation, mental and physical development and adjuvant medicine therapy whenever needed to help correct the innate defence mechanisms to function properly. The autoimmune diseases being on the rise in the society with new scenario of pandemic, there is a great demand for a wholesome immune system that should be persistently corrected and maintained rather than going for blind immunity enhancement.

DEVELOPMENT OF IMMUNE SYSTEM

During pregnancy, the developing fetus has to be tolerant of the maternal antigens, and the maternal immune system has to be feto tolerant. Because the placenta is continuously exposed to the pathogens present in the mother's blood, it has several mechanisms protecting the fetus from the infection. Starting from the 16th week of gestation, until birth, the placenta is also involved in the continuous transfer of passive immunity from the mother to the fetus. The surface cells of the placenta express neonatal receptors for immunoglobulin G (IgG), which bind and pass maternal antibodies to the fetus , which can protect infants during the first months of life, until the maturation of their own immune system.(3)

After birth, the newborn becomes exposed to the enormous number of foreign antigens that require swift immune response. However, the immune system of the newborns is underdeveloped and subdued, fully maturing during the first 7–8 years of life. The first line immune responders present already in the fetus and newborn are the innate immune cells: *monocytes*, macrophages, *dendritic* cells, and *neutrophils*. But the weaker innate immune system in newborns results in susceptibility to infection.

The adaptive immunity includes T cells and B Cells. Although the CD4- and CD8-positive T cells are established around the 15th week of pregnancy, and the mature T cells are already present in the newborn, they are hyporesponsive to the antigens . The newborns also have a special, interleukin-8 (CXCL8)-producing T cells, which activate antimicrobial neutrophils. 40% of the circulating B cells are the B1 cells that only produce low-affinity IgM, and later in life, they become replaced by the conventional B2 cells. Because the newborns and young children have an underdeveloped and immature immune system they have to, at least partially, rely on the immune factors supplied by the mother. (4)

Breast milk contains basic nutrients, antibacterial compounds, chemokines, cytokines, immunoglobulins, hormones, growth factors, lymphocytes, neutrophils and macrophages.

The composition and the level of these compounds change during the different phases of lactation in response to the changing needs of the growing and developing infant. Between the first 72 h and 3 days postpartum the colostrum milk has the highest level of the immunoregulatory factors. The antimicrobial compounds in the milk include lactoferrin, haptocorrin, lysozyme, defensins, cathelicidins, proteins of the complement system, components of the lactoperoxidase system (LP-s), and various glycans. The lactoferrin and haptocorrin are bacteriostatic.The lysozyme, defensins, and cathelicidins disrupt or puncture the wall of the bacteria.Human early colostrum milk contains around 5 million leukocytes/ml. Among them, 10% are B cells, T cells, and NK cells. The remaining leukocytes are mainly neutrophils and macrophages. ILC1s, ILC2s, and ILC3s, rapidly respond to infection.The immune cells present in breast milk are resistant to the child digestive enzymes and can mount a vigorous immune response by directly destroying pathogens

they encounter and shape the infant's gut microbiota, and immunity.

CLINICAL IMPACT DUE TO ADAPTIVE IMMUNE DEFICIT

Neonatal immune responses are generally TH2-skewed, being geared towards immune tolerance instead of towards defense from microbial infections. Neonatal T cells require increased stimulus in order to achieve adult-level responses. Compared to adults, neonates manifest delayed, shortened, and decreased B cell responses that limit their responses to infection and vaccination.(5)

Table 1
Deficits in Neonatal Adaptive Immune Function and the Proposed Clinical Impact.

Adaptive Immune Deficit	**Proposed Clinical Impact**
Limited antecedent exposure of T cells to foreign antigens	Lack of rapid, strong, memory response
Greater requirement for CD4+ T cell stimulation	Decreased T cell activation, proliferation
TH2skewed and attenuated CD4+ T cell cytokine response	Decreased response to infection, particularly intracellular pathogens
Poor CD4+ T cell-dependent B cell stimulation	Poor antibody production
Decreased CD8+ T cell cytolytic activity	Decreased clearance of intracellularly infected cells
Abundant, potent T regulatory cell population present at birth	Inhibited TH1 T cell responses, decreased response to infection, limit vaccine responses of newborns
Maternal antibodies interfere with B cell antibody response	Attenuated antibody production
Weak humoral response, predominantly IgM	Poor opsonization and clearance of bacteria
Poor antibody response to polysaccharide antigens	Increased susceptibility to encapsulated organisms
Deficient CD40 ligand stimulation of B cells	Poor antibody production-lack of memory response
Underdeveloped spleen and lymph nodes	Poor antibody production, poor clearance of bacteria from blood

Table2: Deficits in Neonatal Innate Immune Function and the Proposed Clinical Impact.

Innate Immune Deficit	**Proposed Clinical Impact**
Fragile, easily disrupted skin (particularly in premature)	Portal of entry for microbes
Decreased serum complement components	Decreased complement-mediated killing and opsonization lead to poor bacterial clearance and decreased naïve B cell activation
Defective neutrophil amplification, mobilization, and function (phagocytosis, respiratory burst, lactoferrin and BPI production)	Poor bacterial clearance
Reduced MHC Class 2 expression on antigen presenting cells (APCs)	Poor T and B cell stimulation
Impaired APC function (decreased TH1 polarizing cytokine production, poor antigen presenting function, impaired mobilization, increased stimulation requirement to effect response)	Poor bacterial clearance
Depressed Natural Killer (NK) cell cytotoxic function	Poor clearance of cells infected with intracellular pathogens
Intrinsic immaturity of dendritic cells (DCs)	Poor antigen presenting function, poor memory response
Impaired cytokine production in response to pathogens	Poor chemotactic gradient formation, poor cellular recruitment to site of inflammation
Decreased neutrophil storage pool in bone marrow	Early depletion associated with poor sepsis outcomes
Decreased opsonin production	Decreased uptake and killing by phagocytes
Impaired response to certain TLR agonists, decreased down-stream signaling following TLR stimulation	Decreased chemotaxis and recruitment of innate cellular defenses

NEED FOR IMMUNOMODULATION

Immunomodulators can play the pivotal role in correction and enhancement of the relatively weaker immune system of the child.

RAJANYADI CHURNA - A GLANCE OF INGREDIENTS WITH PROPERTIES(6)

TABLE3

Dravya	*Botanical Name*	*Properties*	*Vyadhikarma*	*Gan*
Rajani/Haridra	*Curcuma Longa*	*R - Tikta, Katu* *G- laghu, Ruksha* *V - Ushna* *Vp- Katu* *Kapha pitta↓*	*Vishahara* *Lekhaniya* *Kushtaghna* *Krimighna* *Shirovirechana*	*Haridradi* *Mustadi* *Agrya - Prameha*
Devadaru	*Cedrus Deodara*	*R - Tikta, Katu* *G -laghu, Ruksha* *V - Ushna* *Vp- Katu* *Kapha Vata↓*	*Krimighna* *Kaphahara* *Kushtahara* *Vatahara* *Kasahara* *Amahara* *ShwasaHara* *Mehaghna* *Vibandahara* *Adhmanahara* *Shophahara*	*Stanya* *Shodhana* *Anuvasanopaga* *Vatashamana*
Sarala	*Pinus Roxburghii*	*R - Katu, Tikta* *G-laghu,* *Snigdha* *V - Ushna* *Vp- Katu* *Kapha Vata ↓*	*Karna, Kanta,* *Akshirogahara* *Vrunopaha* *Kanduhara* *Vranahara* *Kasahara*	*Urusthamba* *Vruna* *Karnarog* *Shoth* *Atisar*
Sreyasi / Gajapippali	*Scindapsus officinalis*	*R – Katu* *G- laghu, Ruksha* *V - Ushna* *Vp- Katu* *Kapha Vata↓*	*Kantamayapaha* *Krumihara* *Shwasahar* *Atisarahara* *Deepana*	*Shatapushpadi varga* *Haritakyadi*
Brhati	*Solanum Indicum*	*R - Katu, Tikta* *G- laghu, Ruksha* *V - Ushna* *Vp- Katu*	*Grahi* *Kanthya* *Hidmanigraha* *Deepana* *Shotahara*	*Brihatyadi* *Dashamoola*

		Kapha Vata↓	*Pachana AngamardhaPrashaman Hrdya jwarahara*	
Kantakari	*Solanum Xanthocarpum*	*R - katu, Tikta G- laghu, Ruksha V - Ushna Vp- Katu Kapha Vata↓*	*Shwasahara Jwarahara Vatahara Amapachan Kanduhara Kushtahara Hrudya Deepana Medohara Balya*	*Kasahara Shothahara Hidmanigraha AngamardaPrashaman Dashamool Varunadi*
Prishniparni	*Uraria Picta*	*R-Madhura, Tikta G-Laghu Snigdha V - Ushna Vp - Madhura VPK↓*	*Jwarahara Swasahara Vamihara Dahahara*	*AngamardaPrashaman Shotha Har Sandhaneeya Haridradi Vidarigandhadi*
Shatapushpa	*Anenthum Sowa*	*R- Katu, Tikta G-Laghu, teekshna V - Ushna Vp - Katu VK↓- p↑*	*Vrana hara Shoolahara Akshirogahara Jvarahara deepana*	*Anuvasanopaga asthapanopaga*

RAJANYADI CHURNA - MODE OF ACTION

Adjuvant-makshika and sarpi

Rajanyadi churna is advocated by Acharya Vagbhata as sreshta deepana oushadha, citing its action on grahani.Rajanyadi is anulomana .

Rogaghnata –

Atisara, Jvara, Shvasa, Kamala, Pandu, Kasa.

Rajanyadi churna is appraised as *sarva roga hara* in *baala*, which explains the vast spectrum of action of the oushadha.

Bala and Varna are the benefits of using the churna.

ANALYSIS OF MODE OF ACTION

During baalya avastha, there is kapha dosha upachaya.This make the child susceptible to aama sanchaya, rasa dushti, rakta dhatu kshaya, medadushti, asthi and majja dhatu kshaya through Srotorodha. There is

susceptibility to atisaara, akshiroga, tvak roga and jvara.Ama dosha when persistant leads to visha bhaava of dhatus that leads to aasu svabhaava of vyadhi, which when suppressed with immunosuppressants leads to chirakaaritva and dhaatu leenatva.(autoimmune and hypersensitivity).

Rajanyadi churna contain dravyas which are tikta, katu rasa predominant with ushna veerya and katu vipaka. Tikta rasa is deepana, jvarahara, amapachana and sroto shodhan.Ushna veerya is kaphahara and pachana.The dravyas are laghu and ruksha guna predominant which do kaphahara, medohara, rasa shudhi and deepana.Visha hara properties of dravyas lead to the metabolization of ama visha that lead to srotoshudhi.

The anupana of Rajanyadi churna are madhu and sarpi in unequal maatra which is tridosha samana, balya and varnya.

RESEARCH ON THE INGREDIENTS OF RAJANYADI

RAJANI/HARIDRA

IMMUNOMODULATORY EFFECTS(7)

Curcumin has been shown to regulate numerous transcription factors, cytokines, adhesion molecules, and enzymes that have been linked to inflammation. curcumin has been shown to have nematocidal activity. T, curcumin treatment modulates cellular and humoral immune responses of infected mice and leads to a significant reduction of parasite burden and liver pathology in acute murine schistosomiasis mansoni.

Curcumin greatly affects both the innate and adaptive arms of immunity through modulating immune cells' function including neutrophils, macrophages, monocytes, natural killer cells (NK cells), dendritic cells (DCs), T cells, and B cells.

DEVADARU(8)

Highest phagocytic and respiratory bust activities were recorded in leukocytes.

The volatile oil of *Cedrus deodara* wood inhibits the process of margination in the blood vessels. It also significantly inhibits Type III hypersensitivity reaction, and Type IV, i.e. delayed type hypersensitivity reaction indicating an inhibitory effect on humoral and cell-mediated immune responses.

SARALA

The essential oil isolated from P.roxburghii is rich in cyclic monoterpene alpha-phellandrene and possesses promising antibacterial as well as anti-proliferative potential.

SHREYASI(9)

Antitumor activity.

lipid peroxidation, GST, GPX, SOD, and catalase levels - antioxidant activity.

KANTAKARI(10)

Significantly reduce the levels of TNF-α

Suppression of markers of oxidative stress

BRIHATI (11)

Enhance immune response due to increased peripheral and splenocyte T-cell proliferations.

Enhanced duodenum traits; increased concentrations of total globulin, γ-globulin and IgA, lymphocyte ratio, and delayed type hypersensitivity (3) reduced E. coli and increased Lactobacillus counts in ileum.

PRISHNIPARNI (12)

Decrease the level of enzymes ALT, ALP and AST with hepatoprotective and Anti inflammatory property.

SHATAPUSHPA(13)

Anti bacterial, Anti oxidant properties.

Conclusion

The study brings into light the action of Rajanyadi churna as a potential immunomodulator which is wholesome for the health of the child through the unique combination of dravyas which cover major aspects of immunomodulation. Considering the current pandemic scenario and rising autoimmune cases the scope for evaluating the advantage of this classical formulation in a novel context should empower the knowledge base of the health system. The study invites attention for further studies to explore the clinical applicability.

REFERENCES

1. Definition of immunomodulation NCI Dictionary of Cancer." https://www.cancer.gov/publications/dictionaries/cancer-terms/def/immunomodulation.
2. Bascones-Martinez A, Mattila R, Gomez-Font R, Meurman JH. Immunomodulatory drugs: oral and systemic adverse effects. Med Oral Patol Oral Cir Bucal. 2014 Jan 1;19(1):e24-31. doi: 10.4317/medoral.19087. PMID: 23986016; PMCID: PMC3909428.
3. Robbins JR, Bakardjiev AI. Pathogens and the placental fortress. Curr Opin Microbiol. 2012 Feb;15(1):36-43. doi: 10.1016/j.mib.2011.11.006. Epub 2011 Dec 12. PMID: 22169833; PMCID: PMC3265690.
4. Schüller SS, Kramer BW, Villamor E, Spittler A, Berger A, Levy O. Immunomodulation to Prevent or Treat Neonatal Sepsis: Past, Present, and Future. Front Pediatr. 2018 Jul 19;6:199. doi: 10.3389/fped.2018.00199. PMID: 30073156; PMCID: PMC6060673.
5. Wynn JL, Neu J, Moldawer LL, Levy O. Potential of immunomodulatory agents for prevention and treatment of neonatal sepsis. J Perinatol. 2009 Feb;29(2):79-88. doi: 10.1038/jp.2008.132. Epub 2008 Sep 4. Erratum in: J Perinatol. 2009 Jul;29(7):527. PMID: 18769381; PMCID: PMC3971053.
6. Chaukhambha Orientalia, AshtangaHridaya, Aruna Dutta, SarvangaSundari Comm. Varanasi, 1982.Uttara Tantra 2/38-40
7. Srivastava RM, Singh S, Dubey SK, Misra K, Khar A. Immunomodulatory and therapeutic activity of curcumin. Int Immunopharmacol. 2011 Mar;11(3):331-41. doi: 10.1016/j.intimp.2010.08.014. Epub 2010 Sep 8. PMID: 20828642.
8. Narayan S, Thakur CP, Bahadur S, Thakur M, Pandey SN, Thakur AK, Mitra DK, Mukherjee PK. *Cedrus deodara*: *In vitro* antileishmanial efficacy & immunomodulatory activity. Indian J Med Res. 2017 Dec;146(6):780-787. doi: 10.4103/ijmr.IJMR_959_16. PMID: 29664038; PMCID: PMC5926351.
9. Shivhare SC, Patidar AO, Malviya KG, Shivhare-Malviya KK. Antioxidant and anticancer evaluation of Scindapsus officinalis

(Roxb.) Schott fruits. Ayu. 2011 Jul;32(3):388-94. doi: 10.4103/0974-8520.93921. PMID: 22529657; PMCID: PMC3326889.
10. Sultana, Rokeya & Khanam, Sakina & Salma, & Kshama, Devi. (2011). Immunomodulatory effect of methanol extract of Solanum xanthocarpum fruits. International Journal of Pharma Sciences and Research. 2.
11. Chen H, Qi X. Study on the effect of polysaccharides from Solanum nigrum Linne on cellular immune function in tumour-bearing mice. African Journal of Traditional, Complementary, and Alternative Medicines : AJTCAM. 2013 ;10(4):41-46. DOI: 10.4314/ajtcam.v10i4.7.
12. Nagarkar, Bhagyashri & Jagtap, Suresh & Nirmal, Pallavi & Narkhede, Aarti & Kuvalekar, Aniket & Kulkarni, Omkar & Harsulkar, Abhay. (2013). COMPARATIVE EVALUATION OF ANTI-INFLAMMATORY POTENTIAL OF MEDICINALLY IMPORTANT PLANTS. International Journal of Pharmacy and Pharmaceutical Sciences. 5. 239-243.
13. Saleh-E-In, Md & Sultana, Nasim & Hossain, Md & Hasan, Sayeema & Islam, M.. (2016). Pharmacological effects of the phytochemicals of Anethum sowa L. root extracts. BMC Complementary and Alternative Medicine. 16. 10.1186/s12906-016-1438-9.

Conflict of Interest: *Non* *Source of funding:* *Nil*

Cite this article:

Sreeja Pillai, Hemant Paradkar, Anaya Pathrikar (2021)"A review of role of Rajanyadi Churna as potential immune-modulator in Kaumarabhritya." Ayurlog: National Journal of Research in Ayurved Science, 9(02). https://doi.org/10.52482/ayurlog.v9i02.804

Ayurlog: National Journal of Research in Ayurved Science- 2021; (09) (02):01- 09