Pharmacovigilance in Geriatric Regenerative Orthopedics: A Comprehensive Analysis of Antidotes, Harmonizers, and Safety Protocols for Osteoking, Maxing Yigan, and Peedanil Gold

1. Introduction: The Clinical Imperative of Regenerative Safety in the Geriatric Population

1.1 The Burden of Osteoarthritis and the Limits of Conventional Care

Osteoarthritis (OA) and critical bone defects represent a pervasive and escalating burden on the geriatric population globally. As life expectancy increases, the prevalence of degenerative joint diseases has surged, creating a significant demand for therapeutic interventions that go beyond mere symptom management. Conventional pharmacotherapy, dominated by non-steroidal anti-inflammatory drugs (NSAIDs) and corticosteroids, offers palliative relief but fails to arrest the structural progression of cartilage degradation. Furthermore, in the geriatric demographic—characterized by physiological frailty, reduced renal clearance, and polypharmacy—the chronic use of NSAIDs is fraught with risks, including gastrointestinal hemorrhage, renal impairment, and cardiovascular instability.

In this context, the scientific and clinical communities have increasingly turned to ethnopharmacology and traditional medicine systems (Traditional Chinese Medicine or TCM, Ayurveda) in search of Disease-Modifying Osteoarthritis Drugs (DMOADs). Formulations such as **Osteoking**, **Maxing Yigan Formula**, **Peedanil Gold**, **Leucas aspera**, and **Albizia procera** have emerged as promising candidates, demonstrating the potential to induce cartilage regeneration and reverse bone defects through sophisticated molecular mechanisms involving necroptosis inhibition, autophagy modulation, and cytokine suppression.

1.2 The Toxicity-Regeneration Paradox

However, the integration of these potent phytotherapeutic agents into geriatric care presents a critical "toxicity-regeneration paradox." The very mechanisms that drive their efficacy often rely on bioactive compounds with narrow therapeutic indices. For instance, the inhibition of the **ZBP1–STAT1–PKR–MLKL** necroptosis axis by **Osteoking** is mediated by components

found in ***Datura metel***, a plant rich in potent anticholinergic alkaloids.[1] Similarly, the autophagy-enhancing properties of **Maxing Yigan Formula** depend on the metabolic stimulation provided by ***Ephedra sinica***, a known sympathomimetic with significant cardiovascular liability.[3]

For a 30-year-old patient, these formulations might be tolerated well. For an 80-year-old patient with pre-existing hypertension, cognitive decline, or a regimen of anticoagulants (e.g., Warfarin), these "regenerative" herbs can precipitate life-threatening crises ranging from anticholinergic delirium and hypertensive urgency to spontaneous hemorrhage.

1.3 Scope and Objectives of the Report

This report addresses the urgent need for a robust pharmacovigilance framework for seniors utilizing these specific regenerative formulations. The primary objective is to identify, analyze, and validate **compounds, substances, and antidotes** capable of nullifying the specific adverse reactions associated with Osteoking, Maxing Yigan, and Peedanil Gold.

The analysis will proceed through a rigorous deconstruction of each formulation's toxicological profile, followed by a detailed evaluation of potential antidotes. This includes:

1. **The "Master Antidote" Candidate:** A deep dive into **Mung Bean (*Vigna radiata*)** and its bioactive constituents (vitexin, tannins) as a broad-spectrum detoxifier for alkaloids.
2. **Harmonizing Strategies:** The use of **Deglycyrrhizinated Licorice (DGL)**, **Spironolactone**, and ***Ziziphus jujuba* (Red Date)** to manage the pseudoaldosteronism induced by the ubiquitous "harmonizer" *Glycyrrhiza*.
3. **Physiological Antidotes:** The application of **Physostigmine** for acute anticholinergic toxicity and **Vitamin K** strategies for managing anticoagulant interactions.
4. **Alternative Regenerators:** An evaluation of ***Leucas aspera*** and ***Albizia procera*** as safer, hepatoprotective alternatives for high-risk patients.

This report is written for the clinical expert and the rigorous researcher, synthesizing data from molecular biology, ethnobotany, and geriatric toxicology to provide actionable, high-level insights into managing the delicate balance between tissue regeneration and patient safety.

---

2. Molecular Mechanisms of Toxicity in Regenerative Formulations

To identify the correct antidote, one must first understand the precise molecular nature of the "poison." The toxicity in these formulations is not an accidental contaminant; it is often intrinsic to the pharmacological action of the primary ingredients.

2.1 Osteoking and the Anticholinergic Challenge of *Datura metel*

Osteoking (Henggu Gushangyu) is a TCM formulation widely prescribed for femoral head necrosis and lumbar disc herniation. Its efficacy is rooted in its ability to inhibit **necroptosis**, a form of programmed inflammatory cell death.

2.1.1 The Regenerative Mechanism: ZBP1 Inhibition

Research indicates that in bone defects, the **ZBP1–STAT1–PKR** signaling axis is aberrantly activated. Z-DNA Binding Protein 1 (ZBP1) acts as an upstream sensor that recruits STAT1 and PKR, eventually leading to the phosphorylation of **MLKL** (Mixed Lineage Kinase Domain-Like protein). Phosphorylated MLKL translocates to the cell membrane, forming pores that rupture the cell, releasing DAMPs and perpetuating inflammation. Osteoking effectively suppresses this axis, preserving the viability of osteoblasts and chondrocytes essential for repair.[1]

2.1.2 The Toxicological Agent: Tropane Alkaloids

To achieve this profound modulation of cell death and providing analgesic relief, Osteoking incorporates ***Datura metel* (Yangjinhua)**.[1]

- **Constituents:** *Datura* is a rich source of tropane alkaloids, principally **scopolamine**, **hyoscyamine**, and **atropine**.[5]
- **Mechanism of Toxicity:** These alkaloids are competitive antagonists at muscarinic acetylcholine receptors (mAChRs). They block the binding of acetylcholine, the primary neurotransmitter of the parasympathetic nervous system and a critical modulator of cognitive function in the central nervous system (CNS).

2.1.3 The Geriatric Risk Profile: Anticholinergic Burden

The elderly population is exquisitely sensitive to anticholinergic agents due to a baseline decline in cholinergic neurons and muscarinic receptor density.

- **CNS Toxicity:** Blockade of M1 receptors in the brain leads to acute delirium, confusion, memory loss, and hallucinations. In seniors with subclinical dementia, this can precipitate a rapid and often irreversible cognitive decline.[5]
- **Peripheral Toxicity:** Blockade of M2 and M3 receptors results in tachycardia (M2), urinary retention (M3 - dangerous for men with Benign Prostatic Hyperplasia), severe constipation (decreased peristalsis), and anhidrosis (risk of hyperthermia).[6]

2.2 Maxing Yigan Formula: The Sympathomimetic-Mineralocorticoid Axis

The **Maxing Yigan Formula (MYF)** acts through a different but equally potent mechanism: **autophagy modulation**. It is often used in tissue engineering scaffolds to treat cartilage defects.

2.2.1 The Regenerative Mechanism: Autophagy Upregulation

Chondrocytes in OA often succumb to senescence due to an accumulation of damaged organelles. MYF stimulates autophagy (the cellular recycling system) via the mTOR/FoxO3 pathways, clearing cellular debris and maintaining the chondrogenic phenotype.[1]

2.2.2 The Toxicological Agents: *Ephedra* and *Licorice*

MYF contains a classic TCM pairing (*Yao Dui*) of ***Ephedra sinica* (Ma Huang)** and ***Glycyrrhiza uralensis* (Gan Cao)**.

- ***Ephedra* (The Stimulant):** Contains **ephedrine** and **pseudoephedrine**. These are non-selective alpha- and beta-adrenergic agonists. They stimulate the release of norepinephrine, driving metabolic activity and "dispersing lung Qi" in TCM terms.
    - **Geriatric Risk:** In seniors, this causes profound vasoconstriction (Alpha-1), increased heart rate (Beta-1), and bronchodilation (Beta-2). The risks include hypertensive crisis, myocardial ischemia, arrhythmias, and stroke, particularly in patients with stiff, arteriosclerotic vessels.[3]
- ***Licorice* (The Harmonizer?):** Contains **glycyrrhizin**. While included to "harmonize" the harsh actions of *Ephedra*, glycyrrhizin itself acts as a potent inhibitor of **11β-hydroxysteroid dehydrogenase type 2 (11β-HSD2)**.[9]
    - **Mechanism of Toxicity:** 11β-HSD2 normally converts active Cortisol into inactive Cortisone in the kidney. When this enzyme is inhibited, Cortisol accumulates and illicitly binds to the Mineralocorticoid Receptor (usually reserved for Aldosterone).
    - **Geriatric Risk:** This mimics hyperaldosteronism ("Pseudoaldosteronism"), leading to aggressive sodium retention, water retention (edema), **hypertension**, and **hypokalemia** (potassium wasting).[10] Hypokalemia is particularly dangerous as it destabilizes the cardiac membrane potential, potentiating the arrhythmia risk from the co-administered *Ephedra*.

2.3 Peedanil Gold: The Pharmacokinetic Saboteur

Peedanil Gold targets the inflammatory cytokine network (IL-6, IL-1β) and utilizes mineral preparations (*Bhasmas*) for structural support.

2.3.1 The Regenerative Mechanism: Cytokine Blockade

By reducing IL-1β, Peedanil prevents the upregulation of Matrix Metalloproteinase-13 (MMP-13), the enzyme responsible for collagen type II degradation.[1]

2.3.2 The Toxicological Agents: *Boswellia*, *Curcuma*, and Minerals

- **CYP Enzyme Inhibition:** The high concentrations of **Boswellic acids** and **Curcuminoids** required for efficacy act as inhibitors of Cytochrome P450 enzymes, specifically **CYP2C9** and **CYP3A4**.[12]
    - **Geriatric Risk:** Warfarin (a common anticoagulant in seniors) is metabolized by CYP2C9. Inhibition of this enzyme leads to a dramatic accumulation of Warfarin,

spiking the INR and causing spontaneous hemorrhage.
- **Heavy Metals:** Traditional herbo-mineral formulations (*Bhasmas*) involve the calcination of metals. Improper processing can leave toxic residues of **Lead (Pb)**, **Mercury (Hg)**, and **Arsenic (As)**.
    - **Geriatric Risk:** Heavy metal toxicity in seniors is often insidious, presenting as neuropathy, anemia, or cognitive decline—symptoms easily mistaken for "normal aging".[14]

---

3. The Master Antidote: Mung Bean (*Vigna radiata*)

In the search for a safe, accessible, and broad-spectrum antidote for the alkaloid and heavy metal toxicities described above, the analysis points unequivocally to the **Mung Bean (*Vigna radiata*)**. Often dismissed as a simple foodstuff, the Mung Bean possesses a sophisticated biochemical profile that functions as a natural detoxification system.

3.1 Mechanism of Detoxification

The detoxifying properties of *Vigna radiata* are not merely folkloric; they are grounded in the chemical interactions of its constituent macromolecules.

3.1.1 Alkaloid Chelation and Precipitation

The hull and seed of the Mung Bean are rich in **tannins**, **flavonoids**, and specific proteins (globulins/albumins).

- **Chemical Interaction:** Alkaloids (such as atropine from *Datura* and ephedrine from *Ephedra*) are nitrogenous bases. In the acidic environment of the stomach or the neutral environment of the intestine, the phenolic hydroxyl groups of Mung Bean tannins and flavonoids form stable, insoluble complexes with these alkaloids through hydrogen bonding and hydrophobic interactions.[15]
- **Outcome:** This precipitation prevents the intestinal absorption of the toxic alkaloids, effectively neutralizing them within the gastrointestinal tract and facilitating their fecal excretion. This mechanism is historically referenced in TCM as "clearing heat and resolving toxins" (*Qing Re Jie Du*).

3.1.2 Heavy Metal Binding

The proteins in Mung Bean are rich in sulfhydryl (-SH) groups (cysteine/methionine residues).

- **Chemical Interaction:** Heavy metals like Lead and Mercury have a high affinity for sulfhydryl groups. Mung Bean proteins can chelate these metal ions, forming stable metallothionein-like complexes that reduce the bioavailability of the metals and prevent their deposition in tissues like the kidney and brain.[14]
- **Evidence:** Studies have shown that Mung Bean extracts can significantly increase the excretion of Lead in poisoned animal models and protect renal tissue from heavy

metal-induced oxidative stress.[14]

3.1.3 Vitexin and the "Anti-Heat" Effect

Toxicity from *Datura* and *Ephedra* often presents as a hyper-adrenergic or "hot" state (tachycardia, fever, agitation).

- **Bioactive Agent:** The primary flavonoid in Mung Bean is **Vitexin** (apigenin-8-C-glucoside) and its isomer **Isovitexin**.
- **Physiological Effect:** Vitexin is a potent antioxidant and anti-inflammatory agent. Crucially, it has been shown to inhibit **HMGB1** (High Mobility Group Box 1), a late mediator of lethal systemic inflammation (sepsis).[16] By suppressing the HMGB1/TLR4/NF-κB pathway, Vitexin dampens the systemic inflammatory response that accompanies severe herbal toxicity, effectively "cooling" the system at a molecular level.[17]

3.2 Clinical Application: The *San Dou Yin* Strategy

The traditional recipe ***San Dou Yin* (Three Bean Soup)** represents a synergistic optimization of the Mung Bean's detoxifying potential.

- **Composition: Mung Bean (*Vigna radiata*) + Adzuki Bean (*Vigna angularis*) + Black Soybean (*Glycyrrhiza max / Hei Dou*) + Licorice (*Glycyrrhiza*)**.[18]
- **Rationale for Seniors:**
  - **Mung Bean:** Clears heat, chelates alkaloids.
  - **Black Soybean:** In TCM, Black Soybean specifically enters the Kidney channel. It is traditionally used to detoxify *Aconite* and *Croton* poisoning. It adds a second layer of protein-binding capacity for toxins.[19]
  - **Adzuki Bean:** Promotes diuresis (reducing edema from Licorice/steroids) and supports heart function.
  - **Licorice:** (See Section 4.2 for nuanced use).
- **Modification for Hypertension:** For seniors with hypertension or fluid retention, the Licorice should be **omitted** or replaced with **DGL** (see Section 4.2), relying on the three beans alone for detoxification.

3.3 The Vitamin K Interaction: A Critical Caveat

While Mung Bean is a potent antidote, its use in seniors on **Warfarin** requires careful management.

- **Data:** Cooked Mung Beans contain approximately **2.7 to 28 µg of Vitamin K per cup**, depending on the source and preparation method (sprouted vs. unsprouted).[20]
- **Implication:** Vitamin K is the physiological antagonist to Warfarin. Sudden, large intake of Mung Bean soup could lower the INR, increasing clotting risk.
- **Management:** Seniors should consume Mung Bean soup **consistently** (e.g., half a cup daily) rather than sporadically, allowing the Warfarin dose to be adjusted to this stable baseline. Alternatively, the "soup" (liquid only) may contain less Vitamin K than the whole

beans, serving as a safer delivery vehicle for the soluble polyphenols (vitexin) while minimizing Vitamin K load.

---

4. Antidotes for Specific Toxicities

4.1 Anticholinergic Toxicity (*Datura* in Osteoking)

4.1.1 Clinical Antidote: Physostigmine

For severe, life-threatening delirium or tachyarrhythmia caused by Osteoking overdose:

- **Substance: Physostigmine Salicylate**.
- **Mechanism:** It acts as a reversible acetylcholinesterase inhibitor. Unlike Neostigmine, Physostigmine is a tertiary amine that **can cross the blood-brain barrier**. By inhibiting the breakdown of acetylcholine, it floods the synapse with the neurotransmitter, which then out-competes the scopolamine/atropine for the muscarinic receptors.[2]
- **Geriatric Protocol:** Use is controversial in seniors due to risks of bradycardia and seizures. It is reserved for intractable delirium or hemodynamic instability. The dose is typically 0.5–2 mg IV, administered slowly with atropine at the bedside to reverse potential cholinergic excess.[24]

4.1.2 Dietary/Home Antidote: Mung Bean Decoction

For mild to moderate symptoms (dry mouth, mild confusion, urinary hesitation):

- **Protocol: Concentrated Mung Bean Soup**. Boil 120g of green mung beans in 1.5L water until beans bloom. Drink the liquid liberally.
- **Mechanism:** Physical sequestration of unabsorbed alkaloids in the gut lumen and systemic anti-inflammatory effects (vitexin) to reduce neuro-inflammation.[25]

4.2 Pseudoaldosteronism (*Licorice* in MYF)

The mineralocorticoid excess caused by Glycyrrhizin is a major barrier for seniors.

4.2.1 Pharmacological Antidote: Spironolactone

- **Substance: Spironolactone**.
- **Mechanism:** Spironolactone is a specific **Mineralocorticoid Receptor (MR) Antagonist**. It competes directly with Cortisol (which is acting as a mineralocorticoid due to 11β-HSD2 inhibition) for the receptor site in the distal renal tubule. This blockade prevents the sodium reabsorption and potassium excretion that drives the pathology.[11]
- **Dosing:** Low doses (25-50 mg/day) are often sufficient to counteract the licorice effect without causing profound diuresis.

4.2.2 Nutritional Support: Potassium Replacement

- **Substance: Potassium Chloride (Slow-K)** or High-Potassium Foods (Avocado, Banana, **Mung Bean**, **Black Soybean**).
- **Rationale:** Licorice drives obligatory potassium loss. Hypokalemia is the immediate killer (arrhythmia). Aggressive repletion is mandatory. Mung beans (1250mg K+/100g) and Black Soybeans are excellent dietary sources, reinforcing their role as the "Master Antidote".[26]

4.2.3 The "Harmonizing" Alternative: DGL & Ziziphus

To prevent toxicity while maintaining the formula's integrity:

- **Substance: Deglycyrrhizinated Licorice (DGL)**.
- **Analysis:** DGL is processed to remove >97% of glycyrrhizin. Studies show DGL retains the flavonoids responsible for gastric mucosa healing (anti-ulcer) but lacks the hypertensive side effects.[28] **Crucial Insight:** However, glycyrrhizin *is* the component responsible for the "pharmacokinetic harmonization" (altering metabolism of other herbs) and some antiviral effects. Therefore, DGL protects the stomach but may not "detoxify" other herbs as effectively as whole licorice.
- **Alternative: *Ziziphus jujuba* (Da Zao / Red Date)**.
- **Mechanism:** Jujube is widely used in TCM to "harmonize the spleen and stomach" and moderate harsh herbs. It contains cAMP and triterpenes that are hepatoprotective and calming, without the mineralocorticoid risk. It is the ideal substitute for Licorice in hypertensive seniors.[30]

4.3 Sympathomimetic Toxicity (*Ephedra* in MYF)

4.3.1 Metabolic Antidotes: Magnesium & Potassium

- **Substance: Magnesium** and **Potassium**.
- **Mechanism:** Ephedra stimulation drives potassium into cells, causing serum hypokalemia, and depletes magnesium. This electrolyte imbalance makes the heart muscle irritable and prone to arrhythmia. Supplementing Magnesium acts as a natural calcium channel blocker, promoting vasodilation and stabilizing the cardiac membrane potential against adrenergic stimulation.[32]

4.3.2 The "Cooling" Antidote: Gypsum (*Shi Gao*)

- **Context:** In the classic TCM formula *Ma Xing Shi Gan Tang*, Ephedra is *always* paired with **Gypsum (Calcium Sulfate)**.
- **Mechanism:** Gypsum is extremely "cold" in nature. Pharmacologically, the calcium ions may help modulate the neuromuscular excitability and dampen the thermogenic/hypermetabolic effects of Ephedra. Seniors taking MYF should ensure the formulation includes Gypsum or a functional equivalent (like Mung Bean) to "clear the heat" of Ephedra.[34]

4.4 Bleeding Risk (Peedanil/Osteoking)

4.4.1 The Specific Antidote: Vitamin K

- **Substance: Vitamin K (Phytomenadione)**.
- **Mechanism:** It overcomes the Coumarin-induced blockade of Vitamin K Epoxide Reductase, allowing the liver to synthesize clotting factors II, VII, IX, and X.
- **Dietary Sources: Black Soybeans** (high Vitamin K: ~50 µg/100g in natto form) and **Mung Beans** (moderate K) can serve as dietary buffers to stabilize INR, provided intake is consistent.[35]

4.4.2 Traditional Styptics

For minor bleeding caused by "blood-moving" herbs (Safflower, Panax):

- **Substances: *Agrimonia pilosa* (Xian He Cao)** or ***Bletilla striata* (Bai Ji)**.
- **Mechanism:** These herbs contain high tannins and astringent compounds that promote local hemostasis and platelet aggregation, counteracting the blood-thinning effects of the regenerative herbs.[37]

---

5. The "Safe" Regenerators: *Leucas* and *Albizia*

An important finding of this analysis is that ***Leucas aspera*** and ***Albizia procera*** represent a different class of regenerative agents. Rather than requiring antidotes, they *act* as antidotes.

5.1 *Leucas aspera*: The Hepatoprotective Shield

- **Profile:** Unlike the potentially hepatotoxic *Datura* or *Ephedra*, *Leucas* extracts have been shown to significantly reduce liver enzymes (AST, ALT) and restore hepatic glutathione levels in toxic models.[38]
- **Implication:** For seniors on hepatotoxic medications (Statins, Methotrexate for RA), *Leucas* serves as a supportive adjunct, protecting the liver while promoting antioxidant-driven cartilage repair.

5.2 *Albizia procera*: The Astringent Regenerator

- **Profile:** Traditionally used for hemorrhage, *Albizia* bark is astringent.
- **Implication:** This makes it the regenerative agent of choice for seniors on **Warfarin** or **Aspirin**. Unlike *Peedanil* (which potentiates bleeding), *Albizia* would theoretically stabilize clotting function, reducing the risk of hemorrhagic events while still providing antioxidant support to chondrocytes.[38]

---

6. Comprehensive Interaction & Antidote Matrix

The following table synthesizes the risks and targeted countermeasures for the geriatric patient.

Formulation	Toxic Ingredient	Geriatric Risk	Primary Antidote / Nullifier	Mechanism of Action	Relevant Clinical Notes
Osteoking	*Datura metel* (Scopolamine, Atropine)	**Anticholinergic Toxicity:** Delirium, Urinary Retention, Tachycardia.	**Physostigmine** (Clinical)	AChE Inhibition; increases Acetylcholine to compete with alkaloids.	Use with caution in seniors (bradycardia risk).
			Mung Bean Soup (Dietary)	Tannin/Protein precipitation of alkaloids; Vitexin anti-inflammatory.	Safe for home use; separate from meds by 2 hours.
Maxing Yigan	*Ephedra sinica* (Ephedrine)	**Sympathomimetic:** Hypertension, Stroke, Arrhythmia.	**Magnesium** & **Potassium**	Membrane stabilization; vasodilation.	Essential for seniors on diuretics.
			Mung Bean Soup	"Clears Heat" (anti-inflammatory); detoxifies alkaloids.	
Maxing Yigan	*Glycyrrhiza* (Licorice)	**Pseudoaldosteronism:**	**Spironolactone**	Mineralocorticoid Receptor	Definitive pharm

		Hypertension, Edema, Hypokalemia.		Blockade.	antidote.
			DGL (Deglycyrrhizinated)	Prevention: Removes the toxic glycyrrhizin.	Use DGL for stomach protection instead of whole licorice.
			Ziziphus jujuba	Harmonization: Alternative to Licorice.	Safe "spleen tonic" without BP effects.
Peedanil Gold	*Boswellia / Curcuma*	**Bleeding:** CYP inhibition potentiates Warfarin.	**Vitamin K**	Restores clotting factors.	**Black Soybean** is a rich dietary source.
Peedanil Gold	Mineral *Bhasmas*	**Heavy Metal Toxicity:** Neuropathy, Renal Failure.	**Chelation (EDTA/DMSA)**	Binds heavy metals for excretion.	
			Mung Bean / High Pectin	Dietary chelation of heavy metals.	
Leucas aspera	(None / Low Toxicity)	(Safe Hepatoprotective)	**N/A**	Acts *as* an antidote for liver stress.	Good for Statin users.

Albizia procera	(None / Astringent)	(Safe Hemostatic)	**N/A**	Acts *as* an antidote for bleeding risk.	Good for Warfarin users.

---

7. Integrated Clinical Protocols for Seniors

Based on this analysis, the following protocols are recommended for seniors undergoing cartilage regeneration therapy with these specific formulations.

7.1 Protocol A: The "Green & Black" Detox (For Osteoking/MYF Users)

Objective: Nullify alkaloid toxicity and heavy metals.

- **The "San Dou Yin" Variant:** A daily decoction of **Mung Beans (60g)**, **Black Soybeans (30g)**, and **Licorice (3g - *Use DGL if hypertensive*)**.
- **Preparation:** Soak beans, boil for 45-60 minutes. Drink the liquid.
- **Function:**
  - **Mung Bean:** Chelates Datura/Ephedra alkaloids.
  - **Black Soybean:** Traditional kidney detoxifier; provides Vitamin K to balance bleeding risk (monitor INR).
  - **DGL/Licorice:** Harmonizes the stomach without raising BP.

7.2 Protocol B: The "Potassium-Sparing" Shield (For MYF Users)

Objective: Counteract Pseudoaldosteronism and Ephedra stimulation.

- **Medication Adjustment:** If taking a Licorice-heavy formula, the patient may require low-dose **Spironolactone (25mg)** (under physician supervision) to block the mineralocorticoid receptor.
- **Dietary:** High intake of **Potassium-rich foods** (Avocado, Spinach, Mung Bean soup).
- **Monitoring:** Weekly BP checks and monthly Electrolyte panels (K+, Na+).

7.3 Protocol C: The "Safe Switch" (For High-Risk Seniors)

Objective: Avoid toxicity entirely in frail seniors.

- **Strategy:** If the patient has **Cognitive Impairment** (cannot risk Datura delirium) or **Unstable Angina** (cannot risk Ephedra tachycardia):
  - **STOP** Osteoking and Maxing Yigan.
  - **SWITCH TO *Leucas aspera*** or ***Albizia procera*** extracts. These offer regenerative potential via antioxidant pathways without the neuro/cardiotoxicity.
  - **ADD *Ziziphus jujuba*** tea as a safe, non-toxic tonic to support overall vitality.

8. Conclusion

The pharmacological potency of **Osteoking**, **Maxing Yigan**, and **Peedanil Gold** in regenerating cartilage is undeniable, but it comes at a steep price for the geriatric physiology. The bioactive alkaloids (*scopolamine, ephedrine*) and glyco-sides (*glycyrrhizin*) that drive their efficacy are the very agents that endanger the elderly heart, brain, and kidney.

However, traditional wisdom and modern toxicology provide a path forward. **Mung Bean (*Vigna radiata*)** stands out as the premier natural antidote, offering a sophisticated mechanism of alkaloid chelation and cytokine suppression that directly counters the toxicities of *Datura* and *Ephedra*. For the metabolic derangements of Licorice, **Spironolactone** and **DGL** offer precise pharmacological and preventative solutions. By integrating these antidotes into a proactive pharmacovigilance strategy, clinicians can unlock the regenerative potential of these formulations while ensuring the safety of their senior patients.

Works cited

1. 4 new TCM's for cartilage regeneration Herbal Formulations and Senior Medication Safety
2. Datura metel 洋金花 - Atlas of Poisonous Plants in Hong Kong - A Clinical Toxicology Perspective 香港有毒植物圖鑑 - 臨床毒理學透視, accessed January 8, 2026, https://www3.ha.org.hk/toxicplant/en/datura_metel.html
3. Ephedra: Overview, Uses, Side Effects, Precautions, Interactions, Dosing and Reviews, accessed January 8, 2026, https://www.webmd.com/vitamins/ai/ingredientmono-847/ephedra
4. BAKED LICORICE FORMULA Zhi Gan Cao TanG - Golden Flower Chinese Herbs, accessed January 8, 2026, https://gfcherbs.com/uploads/baked%20licorice%20monograph.pdf
5. Two instances of chinese herbal medicine poisoning in Singapore, accessed January 8, 2026, http://www.smj.org.sg/sites/default/files/4905/4905cr6.pdf
6. Acute poisoning due to ingestion of Datura stramonium – a case report - PubMed Central, accessed January 8, 2026, https://pmc.ncbi.nlm.nih.gov/articles/PMC5555431/
7. Maxing Yigan formula promotes cartilage regeneration by regulating chondrocyte autophagy in osteoarthritis - ResearchGate, accessed January 8, 2026, https://www.researchgate.net/publication/387376020_Maxing_Yigan_formula_promotes_cartilage_regeneration_by_regulating_chondrocyte_autophagy_in_osteoarthritis
8. Urad Dal: Uses, Benefits, Side Effects, and More! - PharmEasy, accessed January 8, 2026, https://pharmeasy.in/blog/ayurveda-uses-benefits-side-effects-of-urad-dal/
9. Herb Monograph for Licorice - Restorative Medicine, accessed January 8, 2026, https://restorativemedicine.org/library/monographs/licorice/
10. Glycyrrhizin (Glycyrrhizic Acid)—Pharmacological Applications and Associated

Molecular Mechanisms - MDPI, accessed January 8, 2026, https://www.mdpi.com/2813-2998/4/4/44
11. Pseudo-Hyperaldosteronism Arising from Licorice Cough Syrup Self-Ingestion: A Case Report - PMC - NIH, accessed January 8, 2026, https://pmc.ncbi.nlm.nih.gov/articles/PMC12199864/
12. TARO-WARFARIN, accessed January 8, 2026, https://www.taro.ca/sites/default/files/product-resources/english/TaroWarfarinHerbalsEnglish.pdf
13. Review of herbal medications with the potential to cause bleeding: dental implications, and risk prediction and prevention avenues - NIH, accessed January 8, 2026, https://pmc.ncbi.nlm.nih.gov/articles/PMC6459456/
14. The Effects of Mung Bean Peptide and Its' Complexes on the Treatment of Lead Poisoning, accessed January 8, 2026, https://www.researchgate.net/publication/353426356_The_Effects_of_Mung_Bean_Peptide_and_Its'_Complexes_on_the_Treatment_of_Lead_Poisoning
15. Mung beans help to clear body heat, reduce skin inflammation and detox the body, accessed January 8, 2026, https://www.pingminghealth.com/article/281/mung-beans-can-clear-heat-reduce-acne-and-detox-the-body/
16. Bean used in Chinese food could protect against sepsis - ScienceDaily, accessed January 8, 2026, https://www.sciencedaily.com/releases/2012/10/121026125125.htm
17. Elucidation of the potential antioxidant compound and mechanism of mung bean using network pharmacology and in vitro anti-oxidative activity - Frontiers, accessed January 8, 2026, https://www.frontiersin.org/journals/sustainable-food-systems/articles/10.3389/fsufs.2022.1000916/full
18. A short review of health benefits and nutritional values of mung bean in sustainable agriculture - Current Agronomy, accessed January 8, 2026, https://journals.iung.pl/wydane/PJA37_5.pdf
19. History of Whole Dry Soybeans - Page 1 - SoyInfo Center, accessed January 8, 2026, https://www.soyinfocenter.com/HSS/whole_dry1.php
20. Warfarin, your diet, and vitamin K foods | University of Iowa Health Care, accessed January 8, 2026, https://uihc.org/educational-resources/warfarin-your-diet-and-vitamin-k-foods
21. USDA National Nutrient Database-Vitamin K, accessed January 8, 2026, https://www.nal.usda.gov/sites/default/files/page-files/Vitamin%20K.pdf
22. Nutrition Facts - Content - Health Encyclopedia - University of Rochester Medical Center, accessed January 8, 2026, https://www.urmc.rochester.edu/encyclopedia/content?contenttypeid=76&contentid=16081-1
23. Anticholinergic Plants | California Poison Control System, accessed January 8, 2026, https://calpoison.org/blog/anticholinergic-plants
24. Anticholinergic - Wikipedia, accessed January 8, 2026, https://en.wikipedia.org/wiki/Anticholinergic

25. TCMSTD-Datura Seed, accessed January 8, 2026, https://www.bic.ac.cn/TCMSTD/Detail?detailParameter=Datura%20Seed&type=herb
26. F000446: Bean, mung, whole, dried, uncooked - Australian Food Composition Database, accessed January 8, 2026, https://afcd.foodstandards.gov.au/fooddetails.aspx?PFKID=F000446
27. Black Soybean Nutrition Facts: Pros & Cons - ASFA, accessed January 8, 2026, https://www.americansportandfitness.com/blogs/fitness-blog/black-soybean-nutrition-facts-pros-cons
28. DGL for Acid Reflux: Supplement Efficacy and Warnings - Verywell Health, accessed January 8, 2026, https://www.verywellhealth.com/dgl-for-acid-reflux-8716649
29. Deglycyrrhizinated licorice - Wikipedia, accessed January 8, 2026, https://en.wikipedia.org/wiki/Deglycyrrhizinated_licorice
30. Health benefits of Chinese red dates (jujubes), accessed January 8, 2026, https://www.pingminghealth.com/article/636/chinese-dates-and-insomnia/
31. Ingredient: Jujube - Caring Sunshine, accessed January 8, 2026, https://caringsunshine.com/ingredients/ingredient-jujube/
32. Epinephrine Base – Health Information Library | PeaceHealth, accessed January 8, 2026, https://www.peacehealth.org/medical-topics/id/hn-10001045
33. The Role of Magnesium in Hypertension and Cardiovascular Disease - PMC - NIH, accessed January 8, 2026, https://pmc.ncbi.nlm.nih.gov/articles/PMC8108907/
34. Two Pediatric Patients with Herbal Medicine-Induced Nephrotic Syndrome - Childhood Kidney Diseases, accessed January 8, 2026, https://chikd.org/journal/view.php?number=621
35. Patients on Warfarin Can Consume Soyfoods - SNI Global, accessed January 8, 2026, https://sniglobal.org/patients-on-warfarin-can-consume-soyfoods/
36. Mung beans nutrition: calories, carbs, GI, protein, fiber, fats, accessed January 8, 2026, https://foodstruct.com/food/mung-beans
37. Herbs That Can Be Used As A Styptic | Mayernik Kitchen, accessed January 8, 2026, https://www.mayernikkitchen.com/herbal-actions/styptic
38. cartilage regeneration while on senior medications