Table 6: Pharmacological Characteristics of Alternative Therapies				
Selective Estrogen Receptor Modulators (SERMs)				
Agent	Dosing	Pharmacokinetics	Mechanism of Action	Adverse Effects
Clomiphene citrate*	25- 50 mg orally every 1 -2 days	T Max = 5 hours T ½ = 5-7 days	Reduces negative feedback on pit gonadotropin release with a resultant increase in gonadotropins (LH, FSH)	Visual symptoms, flushing, headache, abdominal discomfort
Tamoxifen*	20 mg orally daily	T Max = 5 hours T ½ = 5-7 days	Inhibits hypothalamic and pituitary estrogen receptors, which blocks estrogen negative feedback on gonadotropin release. Thus, hypothalamic pituitary-gonadal gonadotropin release is increased.	Liver abnormalities, liver enzyme changes, ocular disturbances including cataracts, thromboembolic events including deep venous thrombosis and stroke
*Not FDA-approved for use in males FSH: follicle-stimulating hormone, LH: luteinizing hormone, T Max: time to achieve max levels, T 1/2: half life				

Aromatase Inhibitors (AIs)				
Agent	Dosing	Pharmacokinetics	Mechanism of Action	Adverse Effects
Anastrozole*	0.05 - 1 mg every 1-3 days	T Max= 2-5 hours T ½ = 2 days	Inhibits conversion of testosterone to E2	Hot flashes, hypertension, nausea, back pain, bone pain, dyspnea, peripheral edema
*Not FDA-approved for use in males [#] Discontinued in 2008. No longer available for medical E2: estradiol, T Max: time to achieve max levels, T 1/2: half life				

Human Chorionic Gonadotropin (hCG)				
Agent	Dosing	Pharmacokinetics	Mechanism of Action	Adverse Events
hCG[+]	500-4000 IU units SQ or IM 2-3 times per week	T Max 12 hours T ½ = 2 days	Virtually identical activity to LH. Stimulated Leydig cells to make testosterone.	Headache, irritability, depression, fatigue, edema, gynecomastia, injection site pain.
[+] FDA approved for use in males with hypogonadotropic hypogonadism and pediatric patients with cryptorchidism. LH: luteinizing hormone, IM: intramuscular, SQ: subcutaneous, T Max: time to achieve max levels, T 1/2: half life				