

论文

含蔗糖白蛋白包膜微泡超声造影剂制备研究

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摘要:

目的 研制一种新型的直径在数微米范围内的含蔗糖白蛋白微泡超声造影剂。方法 以全氟化碳及少量氧气为微泡中的气体介质,用超声空化方法进行微泡制备。研究了蔗糖对白蛋白包膜微泡半衰期、微泡尺寸保持及热稳定性的影响,测定了含40%蔗糖白蛋白包膜微泡的谐波特性等。结果 常温下(20℃),在一定范围内,随着糖的加入及浓度的增加,白蛋白微泡的稳定性不断加强;当糖质量浓度达到40%,微泡半衰期可延长至50d以上,96%微泡尺寸分布在2-5 μm,常温下保存一月后微泡之间无明显合并现象,同时比未含蔗糖微泡耐热性明显加强,4℃下将制得的微泡保存半年,未观测到微泡数量及尺寸有明显变化,制备出的微泡有较强的非线性特征,在2次谐波上的反射幅度远高于背景散射源及对比金属板。结论 含40%蔗糖的以全氟化碳及少量氧气为气体介质的白蛋白包膜微泡可以成为一种性能优良的超声造影剂。

关键词: 超声造影剂 微泡 蔗糖

STUDY ON THE PREPARATION OF A NEW SUGAR ALBUMIN MICROBUBBLE ULTRASOUND CONTRAST AGENT

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Abstract:

AIM To study a new sugar albumin microbubble ultrasound contrast agents with diameters ranging in several microns. METHODS Microbubbles were prepared by sonication in controlled power and frequency. Perfluoropropane and a little oxygen were adopted as the gas components in the microbubbles. The half-life time and the change of microbubble size as well as heat resistance of the albumin microbubble ultrasound contrast agent when adding saccharose were investigated. The secondary harmonic ability of the produced sugar microbubble were evaluated. RESULTS With increasing sugar concentration in a certain range under normal temperature, the stability of albumin microbubble was constantly enhanced. When the sugar concentration reached 40%, microbubble half-life time was prolonged to more than 50 days, size of the 96% microbubbles remained 2-5 microns and no obvious incorporation occurred between microbubbles when kept 2 weeks under normal temperature (20℃). At the same time heat resistance was also enhanced. The prepared sugar albumin microbubbles (containing 40% sugar) showed no obvious change in quantity when kept half year under 4℃. The sugar containing microbubbles also showed stronger nonlinear properties than the background scatter and compared metal panel. CONCLUSION It is possible to prepare excellent microbubble ultrasound contrast agent with 40% sugar and albumin as its membrane components, perfluoropropane and a little oxygen as its inner gases.

Keywords: microbubble sugar ultrasound contrast agent

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