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## **The separate origins of the Tocharians and the Yuezhi: Results from recent advances in archaeology and genetics<sup>1</sup>**

### **Abstract**

#### *Background*

The origin of the Tocharians and their relationship to the Yuezhi (月氏) have been debated for more than a century, since the discovery of the Tocharian language. This debate has led to progress on both the scope and depth of our knowledge about the origin of the Indo-European language family and of the Indo-Europeans. Archaeological evidence supporting these theories, however, has until now sadly been lacking.

#### *Methods*

During the past decade, discoveries made at the archaeological sites of the Xiongnu (匈奴) and Yuezhi in the northeast part of Xinjiang, China, have strengthened our understanding of the relationship between these two peoples. In this paper, we summarize the recent impact of these archaeological discoveries on our understanding of the complex development and evolutionary process of pre-historical cultural patterns in Xinjiang during the Bronze Age and the early Iron Age, 2,000 B.C. to 200 B.C. As a background to evaluating the cultural change in this region, we have studied the different theories of origin for the Yuezhi and also their relationship to the Tocharians. Samples of ancient DNA data from this region were also important to our research.

#### *Results*

The Xiongnu tombs in the East Tianshan-Barkol grasslands, dating to 200±70 B.C., were identified with the use of cultural factor analysis. Cultural elements of human sacrifices in these tombs are related closely to the archaeological culture in the same region in an earlier age. On the basis of both the analysis of written records from ancient China and the results of archaeological excavations in the last decade, the Yuegongtai-Xiheigou (岳公台-西黑沟) group of sites, dating from 500 B.C. to 200 B.C., were proposed to be the remains of a Yuezhi group. When compared to all the other archaeological cultures in Xinjiang in this period, a distinctly different origin was observed for the Yuegongtai-Xiheigou group as opposed to those cultures related to the Tocharians, including the Xiaohe (小河) culture and the Charwighul culture. Ancient DNA data portrayed a great

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diffusion of populations of different genetic makeup into this area of Xinjiang during the prehistoric period.

### *Conclusion*

In this study, we used archaeological discoveries of the last decade to propose a separate origin for the Tocharians and the Yuezhi group. Further re-evaluation is needed to understand the interaction and fusion of the Tocharians and Yuezhi in the following historical age.

## **1. Introduction**

The Tocharian language is a branch of the Indo-European language family, and it was spoken in northwest China. The relevant extant manuscripts date from the 4<sup>th</sup> to 10<sup>th</sup> centuries A.D. (Peyrot 2008: 199–209). Tocharian is an ancient Indo-European language belonging to the Centum branch. This means that an Indo-European people, rather than one speaking Eastern Iranian, entered into territory that is now in modern China at a very early time. Most scholars hold that the Tocharian dialects A, B and C are actually Agnean, Kuchean and Krorānian (Mallory 2010).<sup>2</sup> The discussion concerning the Tocharian language has led to considerable progress in both the scope and depth of our knowledge of the origin of the Indo-European language family and the Indo-Europeans (Henning 1978, Gamkrelidze and Ivanov 1989).

The Yuezhi (月氏) were an ancient population living in Northwest China. They are mentioned in many ancient Chinese books and records. After they were defeated by the Xiongnu, the Yuezhi split up into two groups. One moved westward, conquered Bactria, and established a kingdom there. According to records left by the Greek geographer Strabo, four nomadic tribes wrested control of Bactria from the Greeks. One of these four tribes were the Tokharoi (Tochari). While some scholars propose that Tochari is another name for the Yuezhi, others consider that the conquest of the Yuezhi and the movement of the four tribes were two separate events (Narain 1987, Xing Wang 2002). The main theory is that the Yuezhi were a tribal federation dominated by the Tocharians that absorbed various East Iranian-speaking tribes in the course of its westward migration (Enoki et al. 1994).

Previous theories about the relationship between the Tocharians and the Yuezhi were usually based on linguistic evidence, oral traditions or historical information. Few studies have explored the archaeological evidence for these two ancient populations. In recent decades, archaeological discoveries in the area of Xinjiang have provided new clues to the origin of the Tocharians. Mummies with Caucasoid features were discovered in tombs from Gumugou (Qawrighul) and Xiaohe in the Tarim Basin. According to

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<sup>2</sup> There are some questions regarding “Tocharian C”. The “A” language is sometimes called *Ārsi* (*ārśi-kāntu* ‘the *ārśi* language’; cf. also *ārśi-ype* ‘the land of *ārśi*’).

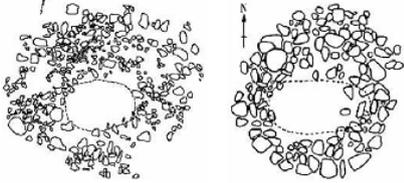
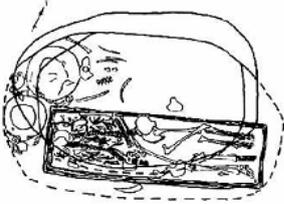
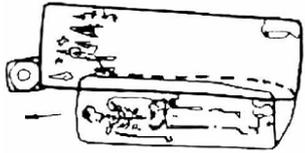
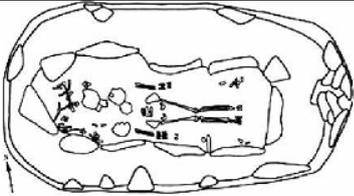
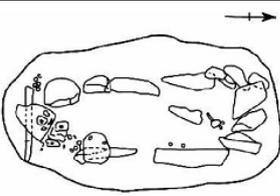
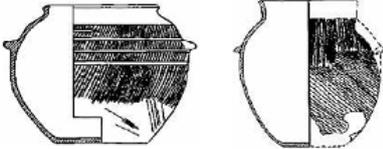
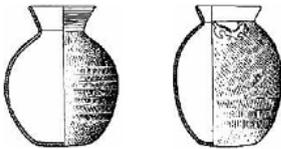
craniological analysis, these remains are extremely similar to the Chalcolithic or Bronze Age Proto-European remains that have been excavated in South Siberia, Kazakhstan, Central Asia and as far as the lower Volga. Hence, it has been proposed that these ancient populations are closely connected to the origin of the Tocharians (Baumer 2002, Mallory and Mair 2000).

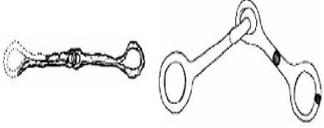
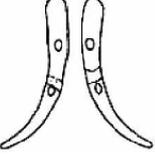
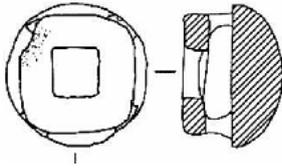
In this study, we present an extensive analysis of the archaeological discoveries in Xinjiang, China. We analyze, for the first time, the archaeological sites of the Yuezhi in the East Tianshan-Barkol grasslands. We also discuss the cultural transition in Xinjiang between 3000 B.C. and 100 B.C. and explore the correlation between possible archaeological sites of the Yuezhi and the Tocharians. Based on the analysis of ancient genetic material, we seek to identify traces of historical movements in this region.

## **2. The Xiongnu Tombs in the East Tianshan-Barkol Grasslands**

During the last 20 years, a great number of archaeological sites have been excavated in the East Tianshan-Barkol grasslands. Two major types of remains have been identified (Wang 2008). The first type is represented by the Yuegongtai-Xiheigou (岳公台-西黑沟) sites and the second by the Heigouliang-Dongheigou (黑沟梁-东黑沟) sites.

The Heigouliang-Dongheigou sites are characterized by mound stone graves, dating to  $200 \pm 70$  B.C. With the application of cultural factor analysis, these sites were identified as the remains of ancient Xiongnu populations (Wang 2008, Mo 2010, Ren 2011). Comparison of cultural elements was carried out between the Heigouliang-Dongheigou sites and other contemporary ancient cultures. Cultural features of the Heigouliang-Dongheigou sites are close to other Xiongnu sites that were found in Mongolia and the northwest boundary of China. The similarities are reflected in the shapes and structure of the tombs, funeral customs, rock paintings, the surface ornamentation of pottery, harness types, bronze mirrors, weapons and metal decoration. All these characteristics distinguish the Heigouliang-Dongheigou sites from the surrounding cultures and underline its uniformity with other Xiongnu archaeological sites.

Item	Heigouliang-Dongheigou sites	Xiongnu/Proto-Xiongnu Remains
Mound		
Wood furniture		
Stone furniture		
Surface ornamentation of pottery		
Rock paintings		

<p>Harness</p>		
<p>Harness</p>		
<p>Harness</p>		
<p>Bronze weapons</p>	 <p>东黑沟 M010 : 1 东黑沟 GT1 ②c : 38 黑沟梁 I M3 : 7 黑沟梁 I</p>  <p>黑沟梁 I M31 : 13 黑沟梁 I M10 : 5 黑沟梁 I M21 : 13 黑沟梁 I M28 : 14 黑沟梁 I</p>  <p>黑沟梁 I M17 : 6 黑沟梁 I M28 : 19 黑沟梁 I M22 : 7 黑沟梁 I M49 墓室 : 5</p>	 <p>毛庆沟 H5 : 6 鄂尔多斯 收集 玉隆太 鄂尔多斯 收集</p>  <p>鄂尔多斯 收集 M1 : 3 呼鲁斯太 M3 : 1 西沟畔 昌平白孚 M38 : 4 毛庆沟 收集</p>  <p>伊沃尔加 鄂尔多斯收集 德列斯图依</p>

Metal decoration	 黑沟梁 IM35	 固原上台村
	 黑沟梁 IM4 : 1	 毛庆沟 M55 : 4
	 东黑沟 M012 : 30	 阿鲁柴登
	 东黑沟 M012 : 33	 阿鲁柴登

Table 1. Comparison of cultural elements between the Heigouliang-Dongheigou sites and Xiongnu remains (cf. Wang Jianxin 2004, 2008)

According to the extant remains, these sites can be traced back to the early stage of the Western Han Dynasty. The aboriginal culture and Xiongnu culture are two prominent cultural representatives of these sites. In addition, traces of the Subeishi (Subaši etc.) culture, Chinese culture and many recent cultures were discovered there. More importantly, human sacrifices were found in tombs from these sites. According to some historical records and archaeological research, especially studies on the relation of tomb owners to human sacrificial remains, the connection between the Xiongnu and the local aborigines was based on conquering and being conquered, ruling and being ruled (Wang 2008, Mo 2010, Ren 2011).

### 3. Yuegongtai-Xiheigou sites in the East Tianshan-Barkol grasslands

The cultural elements of human sacrifices in tombs of the Heigouliang-Dongheigou sites are strongly related to those found at the Yuegongtai-Xiheigou sites (Wang 2008, Zhao 2011). Human sacrifices in Heigouliang-Dongheigou sites were found together with minor objects such as ceramic vessels, metal tools, accessories and rosaries. These artifacts probably belonged to the individual who was sacrificed. The style of these artifacts is different from that of the funeral objects of the tomb owner. According to a systematic study and analysis, they are similar to the remains found of an early period in

the graves in the Yanbulaq necropolis, the Baichier necropolis and the Wupu necropolis in the same region.

The Yuegongtai-Xiheigou sites belong to the archaeological culture characterized by non-mound stone graves (Wang 2008, Zhao 2011). A non-mound stone grave is a type found in the East Tianshan-Barkol grasslands. In these, there is no mound or cairn on the surface of the ground, but stone blocks were used to construct the frame or fill the tombs. Generally, they are characterized by the coexistence of a terrace built of stone, an encircling stone wall, stone tombs and cliff carvings. The date of the Yuegongtai-Xiheigou sites, 500 B.C. to 200 B.C., was determined by comparison with the Heigouliang-Dongheigou sites.

These remains represent a type of early nomadic culture that once occurred widely in the East Tianshan-Barkol grasslands (Figure 1), lasting from 1000 B.C. to 200 B.C. (here called the Barkol culture). Related archaeological sites range from Qitai (奇台) county in the west to Mazong (马鬃) Mountain in the east (Zhao 2011). Uniformity of cultural characteristics was observed in remains of tombs from all sites in this region, supporting the nomadic lifestyle assumed for the ancient inhabitants.

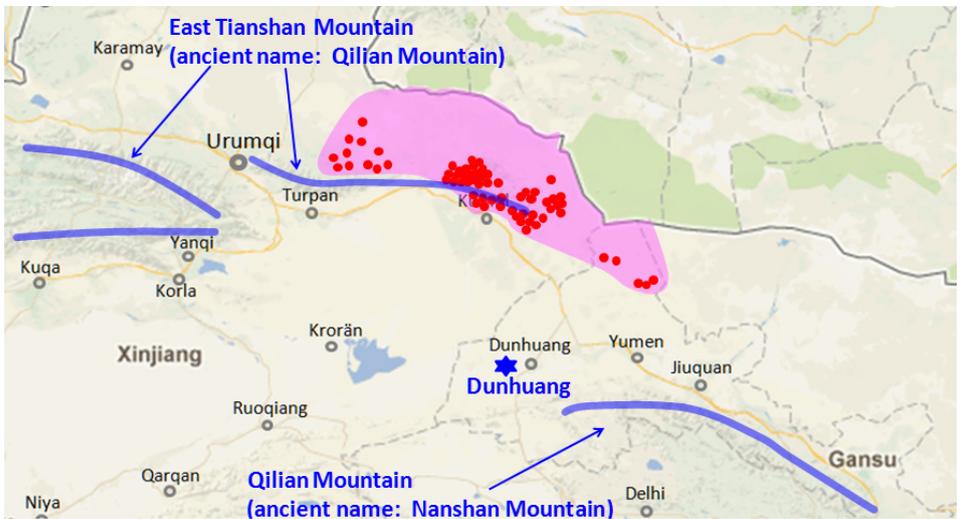


Figure 1. Distribution of non-mound stone graves in Barkol, Xinjiang between ~1000 B.C. and 200 B.C. Each red dot represents one site. (cf. Wang Jianxin 2004, 2008, Zhao Jinglong 2011)

#### 4. Misunderstanding of the historical records on the Yuezhi

The misinterpretation of Chinese historical records in the past has led to a misunderstanding about the origin of the Yuezhi people. According to the records of the

“Shiji 史记” and the “Han Shu 汉书”, the original settlement of the Yuezhi was located between Dunhuang and Qilian Mountain. After studying all the pertinent records, it seems that they already had been living in this region for a long period before ancient Chinese historians recorded their existence. It is commonly accepted that “Yuzhi 禺知,” “Yushi 禹氏,” as well as several other names from the records of the Early West Zhou (1064 B.C. to 771 B.C.), all represent alternative names for the Yuezhi people. Also, it is generally acknowledged that “Dunhuang” is located in Dunhuang county in the Gansu Province. On the other hand, there are serious arguments regarding the actual position of Qilian Mountain. Some scholars consider the “Qilian Mountain” mentioned in these historical records to simply be the Qilian Mountain located in the south of the Gansu Province. So, we should look for archaeological remains of the Yuezhi in that province. In the Bronze Age, the Siba (四坝) culture and the Shajing (沙井) culture are supposedly archaeological remains of the Yuezhi people (Guo and Chen 1989, Yang 1986). In actuality, in the Western Han Dynasty, the original name of modern Qilian Mountain in the Gansu Province was Nanshan Mountain (meaning ‘South Mountain’ in Chinese, 南山). Many historians have argued, however, that the “Qilian Mountain” in the Western Han Dynasty historical records is today called East Tianshan Mountain (Lin 1998). This is also supported by detailed records in the “Shiji” and the “Han Shu” (Wang 2004).

According to the historical records, the activities of the Yuezhi can be divided into four stages:

1. Stage I, from ancient times to ~200 B.C. The Yuezhi lived in the grasslands between Dunhuang and Tianshan Mountain. During this time, they defeated the Wusun (乌孙) in the west and killed their King Nandoumi (难兜靡). It is thought that the Yuezhi extended their rule to the northwest part of Gansu and the southwest part of Mongolia. The son of the Xiongnu Chanyu, Modu, was sent to the Yuezhi people as a hostage.
2. Stage II, from ~200 B.C. to 170 B.C. The Yuezhi were defeated by Chanyu Modu and Chanyu Laoshang of the Xiongnu, and then moved westward to the area of Saka in the Valley of the Ili River. The Yuezhi conquered the Saka and forced them to move to the southwest. During this period, the Yuezhi tribe took over the original homeland of the Saka.
3. Stage III, from ~170 B.C. to ~130 B.C. At the beginning of this stage, the Yuezhi were defeated soundly by a united army of the Wusun and Xiongnu. Then the Yuezhi moved westward again and came into Transoxania.
4. Stage IV, after ~130 B.C. The Yuezhi crossed the Oxus River and conquered Bactria. The subsequent events, such as the establishment of the Kushan Empire, are well recorded in history.

## 5. Possible remains of the Yuezhi group

As described above, the Yuezhi are an ancient nomadic population that lived between Dunhuang and the Tianshan Mountains before they were first mentioned in the Chinese historical record in about 200 B.C. Before the rise of the Xiongnu Chanyu Modu, the Yuezhi had a strong power base, ruling a vast region that ranged from the Gansu Province to the Tianshan. After that time, the Yuezhi suffered several defeats and finally moved westward into Bactria (Enoki et al. 1994, Wang 2004).

Between 1000 B.C. and 200 B.C., three major ancient cultures were active between Tianshan and Dunhuang. In the western part of this region, the Subeishi culture was dominant in the Turpan Basin and surrounding area. In the east, the Yanbulaq culture centered around the Qumul Basin. The region in the south was isolated from other South Xinjiang cultures by the Taklamakan Desert. In the north of the Turpan and Qumul basins, a set of nomadic remains distributed widely on grasslands from west to east has been found.

Archaeological remains presumed to be those of the Yuezhi would be expected to be found within the geographical scope and chronological range of the culture. The economies of both the Subeishi and Yanbulaq cultures were a combination of prosperous oasis agriculture and alpine transhumance. In the Turpan Basin area after 200 B.C., the Subeishi culture developed into the local walled nation-state called the Gushi Kingdom. The Yanbulaq culture declined after 500 B.C. and finally disappeared from the northern hills of the Qumul Basin. By contrast, archaeological sites of the Barkol culture contain purely nomadic remains. This culture was originally associated with nomadic cultures in the south-central part of Inner Mongolia. Their way of life was closely related to the Nanwan type of the Tianshan North Road culture that lasted from 1500 B.C. to 1000 B.C. (Guo 2012). Both the geographical scope and chronological range of the Barkol culture corresponded to the period of the Yuezhi.

This connection is further supported by cultural changes in this region. According to archaeological discoveries, this region was conquered by another people with a different culture after 200 B.C. Remains of this culture were similar to finds of Xiongnu materials in Mongolia and North China. Hence, we can conclude that they were created by a group of Xiongnu people who migrated westward into this region. Cultural elements of human sacrifices in the Heigouliang-Dongheigou sites are closely related to those found in the Yuegongtai-Xiheigou sites, which show elements of the Barkol culture that persisted from ancient times to that period (Wang 2008, Zhao 2011, Wang 2004).

Based on the evidence discussed above, we propose that a set of non-mound stone graves in the Barkol grasslands, tentatively called the Barkol culture, are possibly remains of the ancient Yuezhi population.

## 6. Cultural transition in ancient Xinjiang

With the benefit of the great progress made in archaeology in the recent three decades, a basic space-time framework of culture transition in ancient Xinjiang has been developed by analyzing the cultural characteristics and chronology of all kinds of remains in this region. The prehistoric period of Xinjiang can be divided into three stages (Guo 2012, Shao 2007).

1. Stage I, from ancient times to 1500 B.C. Few relics are found from this stage. Nearly all cultures have interactions outside of Xinjiang. Around the Altai region, the origin of the Qiemuerqieke (切木尔切克; Chemurcek) stone figures and graves is associated with the Afanasievo and Yamna cultures. During its development, it is influenced by the Okunev culture in the Minusinsk Basin. In the south, near Lop Nor, excavations brought to light the Xiaohe culture. The origin of this culture also is associated with the Qiemuerqieke and Afanasievo cultures. In the east, the Tianshan North Road culture appears in the Qumul Basin. The origin of this culture is associated with the Machang (马厂) and Siba (四坝) cultures in the Gansu Province.
2. Stage II, from ~1500 B.C. to 1000 B.C. In this period, exotic cultures remain in control, but in some parts the native cultures have begun to develop. Around the Altai region, the Kuxi (库希) remains and sites in Shihezi City represent new kinds of remains that are closely connected to the expansion of the Karasuk culture in this region. In the Qumul Basin, the southern part of the Tianshan North Road culture is succeeded by the Yanbulaq culture. In the northern region, it develops into the Nanwan type of this culture. The Nanwan type of the Tianshan North Road culture moves westward and gives rise to the Sidaogou (四道沟) culture in the northern foothills of Tianshan Mountain. In the Tarbagatai region and the Valley of the Ili River, the expansion of the Andronovo Complex covers this region and has a great impact on other cultures around it. In the Yanqi Basin, a local culture, the Xintala (新塔拉) culture, arises under influences from several cultures surrounding this region. Some historians argue that the Qiemuerqieke culture and Tianshan North Road culture are two major sources of this culture. In the Kucha region, the Haladun (哈拉墩) remains also show complex characteristics. The Aka Tala remains around Aksu and Kashgar are believed to be associated with the Chust culture in the Ferghana Basin. North Niya (尼雅北部) remains and Liushui (流水) Tombs in Keriya (于田) county are two hybrid cultures with influences from the west and the ancient culture in the Gansu and Qinghai Provinces.
3. Stage III, from ~1000 B.C. to 200 B.C. During this period, local cultures from the previous stage develop fully, although foreign cultural factors are still playing an important role. Around the Altai region, there are two major types of remains. One type is represented by the remains of the Sandaohaizi (三道海子). This culture was distributed widely in Tuva (the famous Arzhan Royal Necropolis) and in the

western part of Mongolia. The other type is represented by Late Qiemuerqieke remains of unknown origin. In the Qumul Basin, the Yanbulaq culture flourishes, but it finally disappears at the end of this stage. During this period, a nomadic culture arises in the grasslands in the north of the Qumul Basin. In the Turpan Basin, the Subeishi culture expands into a much wider geographic area in this period. During this same time, the Valley of the Ili River is ruled by the Sodungbrak culture, which shows characteristics similar to remains of the Andronovo Complex in Kazakhstan. Around the Kashgar region, the famous Xiangbaobao tombs also are associated with the Chust culture in the Ferghana Basin. In the south of Xinjiang, the Zaghunluq culture shows a great similarity to that in the Xiaohe Cemetery, and craniometrical measurement has confirmed the direct relationship. On the other hand, it is affected intensely by the Chust culture in the Ferghana Basin. During its development, elements from the Chawighul and Subeishi cultures also can be observed.

## **7. Genetic evidence for migration into Xinjiang from multiple directions**

In recent decades, genetic testing has been applied to a large number of human remains excavated from archaeological sites in Xinjiang and its surrounding area. In the following, we summarize all available genetic data from ancient cultures in this region and add our own unpublished data from the Qumul and Heigouliang sites. The dating of these archaeological remains ranges from 6000 ybp to 1200 ybp (Table 2, overleaf).

No	Archaeol. Culture	Tombs	Date	DNA Marker	Test Region	n	East	West	Others	Reference
1	Tianshan North Road Culture	Wupu Tombs, Qunmul	3200 ybp	mtDNA	1621016402	12	9	2	1	He Huiqing et al., 2003
2	Jingjue Kingdom	Niya Sites	2535-1480 ybp	mtDNA	HVS-I, RFLP	1		1		Xie Chengzhi et al., 2007a Guo Shirzhu et al., 2007
3	Chawighul Culture	Chawighul I Tombs	3000-2600 ybp	mtDNA	HVS-I	2	1	1		
4	Xiongnu	Chawighul III Tombs	~2000 ybp	mtDNA	HVS-I	1		1		Xie Chengzhi et al., 2005
5	Chawighul Culture	Chawighul IV Tombs	2900-2600 ybp	mtDNA	HVS-I	6	1	5		
6	Subeishi Culture	Goubel I	~2000 ybp	mtDNA	HVS-I	4				
		Subeishi Tombs	2400-2300 ybp	mtDNA	HVS-I	6	12	8		Cui Yinqiu, 2003 Cui Yinqiu et al., 2002
		Yanghai Cemetery	3000-2600 ybp	mtDNA	HVS-I	10				
7	Xiaohe Culture	Gunnougou Cemetery	4000-3500 ybp	mtDNA	HVS-I	11		10	1	Cui Yinqiu et al., 2002 Cui Yinqiu et al., 2004
8	Xiaohe Culture	Xiaohe Cemetery	3980 ± 40 ybp	mtDNA	HVS-I, RFLP	20	14	5	1	
Y-NRY				Y-SNP, Y-STR	7		7			Li Chunxiang et al., 2010
9	Khotan Kingdom	Sampula Sites	2233-2167 ybp	mtDNA	HVS-I, RFLP	13	6	5	2	Xie Chengzhi et al., 2007a Gao Shirzhu et al., 2009

10	Zaghunluq Culture	Gavaerk Grave, Qarqan	2701-2054 ybp	mtDNA	HVS-I, HVS-II, RFLP	25	10	15		Sun Yuefeng, 2006
11	Zaghunluq-Qarqan Culture	Zaghunluq Tombs	2600-1900 ybp	mtDNA	HVS-I, RFLP	15	11	4		Ge Binwen et al., 2008 Gao Shizhu et al., 2009
12	Walled Nation-State	Yuansha Ancient City	2500-2000 ybp	mtDNA	HVS-I, RFLP	15	6	6	3	Gao Shizhu et al., 2009
13	Qijia Culture	Lajia Site	3800-4000 ybp	mtDNA	HVS-I, HVS-II, RFLP	14	14			Gao Shizhu et al., 2007
14	Han Dynasty	Taojiazhai Tombs	2000-1600 ybp	mtDNA	HVS-I, RFLP	14	14			Zhao Yongbin et al., 2011
14-Y				Y-NRY	Y-SNP	12	12			
15	Tubo Dynasty	Reshui Tombs	~1200 ybp	mtDNA	HVS-I	3	3			Cui Yinqiu et al., 2004b
16	Rong (戎)	Pengyang Tombs	2500 ybp	mtDNA	HVS-I, RFLP	6	6			Zhao Yongbin et al., 2010
16-Y				Y-NRY	STR	4	4			
17	Xiongnu	Egyin Gol Site	~2000 ybp	mtDNA	HVS-I	46	41	5		Keyser-Tracqui et al., 2003
18	Kitoi Culture	Lokomotiv	~6000 ybp	mtDNA	HVS-I, RFLP	31	28	2	1	
19	Serovo-Glazkovo Culture	Ust-Ida	~5100 ybp	mtDNA	HVS-I, RFLP	39	33	3	3	Mooder et al., 2006
20	Andronovo Culture	Mixed	3800-3400 ybp	mtDNA	HVS-I, RFLP	10	1	8	1	
20-Y				Y-NRY	STR	3	1	2		
21	Karasuk Culture	Mixed	3400-2800 ybp	mtDNA	HVS-I, RFLP	4		2	2	Keyser et al., 2009
22	Tagar	Mixed	2800-1900	mtDNA	HVS-I, RFLP	12	3	7	2	

22-Y	Culture		ybp	Y-NRY	Y-SNP, Y-STR	7		7		
23	Tachyk Culture	Bogratsky, Khakassia	1900-1400 ybp	mtDNA	HVS-I, RFLP	6	2	3	1	
24	Bronze Age	Mixed, Kazakhstan	3400-3000 ybp	mtDNA	HVS-I, RFLP	14		14		Lalueza-Fox et al., 2004
25	Iron Age	Mixed, Kazakhstan	2800-1500 ybp	mtDNA	HVS-I, RFLP	22	6	6	16	
26-Y	Tianshan North Road Culture	Mixed	3900-3300 ybp	Y-NRY	Y-SNP, Y-STR	6	6			Unpublished data
27-Y	Xiongnu and Human sacrifices	Heigouliang Tombs	~2200 ybp	Y-NRY	Y-SNP, Y-STR	12	12			

Table 2. Genetic data of ancient populations in Xinjiang and surrounding area

On the steppe of Kazakhstan, all samples prior to the 13<sup>th</sup>–7<sup>th</sup> centuries B.C. belong to European lineages. After the Bronze Age, the arrival of East Eurasian sequences that coexisted with the previous West Eurasian genetic substratum can be detected (Lalueza-Fox et al. 2004). The earliest contact between West and East can be observed in the central part of southern Siberia (Keyser et al. 2009). A typical west mtDNA component, U5a, was detected in the Lokomotiv cemetery around Baikal Lake dated to about 6000 years bp. It is believed that the appearance of Afanasievo populations in the Eastern steppe is the result of an eastward migration of populations from the Yamna culture. This provides a possible explanation for the emergence of a European component in the gene pool of the ancient south Siberians. In a later period, both maternal and paternal Western lineages dominate among populations north of the Altai Mountains (i.e., the Minusinsk Basin and surrounding area). By contrast, no West Eurasian lineage was detected up to the early Iron Age in the central part of China, as at the Gansu and Qinghai provinces (Gao et al. 2007, Zhao et al. 2011, Cui et al. 2002, Zhao et al. 2010).<sup>3</sup>

An admixture origin was discovered in the oldest archaeological site containing human remains in Xinjiang, at the Xiaohe cemetery, with analyses of both Y chromosomal and mitochondrial DNA (mtDNA). All of the male individuals in the Xiaohe cemetery belong to a typical West Eurasian haplogroup, R1a1a, whereas mtDNA analysis revealed both the East Eurasian haplogroup (C) and the West Eurasian haplogroups (H and K) (Li et al. 2010). Haplogroup C is a typical maternal lineage in Siberia, thus supporting one of the hypotheses about the origin of the Tocharians. It has been proposed that ancestors of the Tocharians were the earliest population in Bronze Age Xinjiang, and that they originally were connected with people of the Afanasievo culture.

In the region around the Qumul Basin, mtDNA analysis has revealed both East Eurasian and West Eurasian components (He et al. 2003). On the other hand, according to our unpublished data from the tombs of the Tianshan North Road culture and the Heigouliang sites in the grasslands of Barkol, only East Eurasian paternal lineages have been observed in this region until now. This concept corresponds to the analysis of cultural elements by archaeologists. As discussed above, the Tianshan North Road culture is a descendant of the Machang culture expanded from the Gansu Province. During the development of this culture, it was influenced by the Siba culture from the east and the Qiemuerqieke culture from the west. In a later period, the Yanbulaq culture arose in the Qumul Basin at about 4000 ybp, succeeding the Tianshan North Road culture, while receiving strong influences from the Xindian (辛店) and Kayue (卡约) cultures from the east. On the other hand, the Barkol culture, a purely nomadic culture in the Barkol grasslands, originally was associated with nomadic cultures in south central Mongolia. Many of their remains are closely related to the Nanwan type of the Tianshan North Road culture that lasted from 1500 B.C. to 1000 B.C. As discussed above, we propose that the Barkol culture possibly represents remains of the Yuezhi people. They were originally an admixture of aboriginals from around

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<sup>3</sup> Supplemented by unpublished data from our lab.

the Qumul Basin and the nomadic population that immigrated from Mongolia or its boundary with China.

In the western part of Xinjiang, genetic testing also was conducted on human remains from the Subeishi culture, the Chawighul culture, the Zaghunluq culture, the Jingjue Kingdom, the Khotan Kingdom and the ruins of Yuansha (Table 2). East-West admixture was observed in all of these populations except those with only one tested sample (the Niya sites and Chawighul III tombs). These results present a complex demographic history of this region. It is noteworthy that there is so far no genetic data associated with the Tocharians.

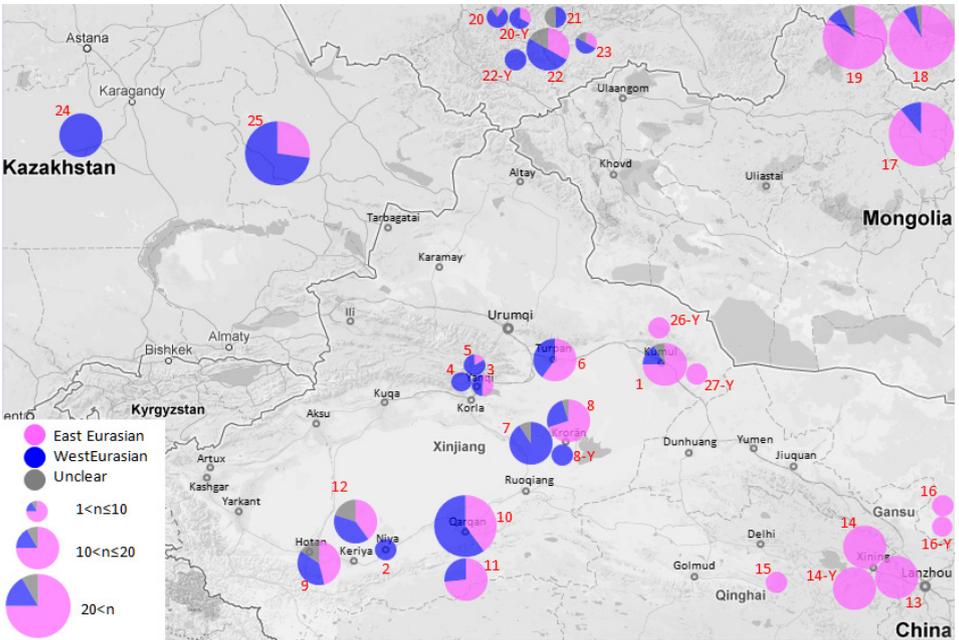


Figure 2. Components of East or West Eurasian heritage in ancient populations in Xinjiang and its surrounding area. Population numbers refer to Table 2. (cf. Guo Wu 2012)

### 8. The possible archaeological culture of the Tocharians

After the first direct contact, about 200 B.C., ancient Chinese historians began to take notice of the populations in Xinjiang (Enoki et al. 1994, Wang 2004, Ma and Sun 1994). From that time, more than 30 walled nation-states have been documented. The entry of the powerful Han and Xiongnu into this region then changed the geopolitical map. The Barkol grasslands and the Zhungar Basin were conquered by the Xiongnu. The Barkol grasslands were an important military location controlled by the states in Xinjiang. More importantly, the treasury of whoever controlled the region benefited greatly from

taxation along the Silk Road, and this led to continuous battles between the Xiongnu and the Han Dynasty in this region. After the westward movement into the Valley of the Ili River, the Wusun established a strong state there and remained an important power in Central Asia until the 5<sup>th</sup> century A.D.

According to archaeological discoveries from this period, these populations inherited most of the ancient cultures described above in Stage III (Guo 2012), even though they were under the rule of the Han or the Xiongnu in different periods (Ma and Sun 1994). The Subeishi culture survived after the entry of the Han, and it inherited from the population of the Gushi (姑师) Kingdom. In the southern part of Xinjiang, certain types of objects of the Zaghunluq culture, such as black-coated clay pottery, still were widely used in Qiemo (Jumo 且末), Jingjue (精绝; Cađota), Ganmi (扞弥; Khuvani), Yutian (于阗; Khotan), Pishan (皮山) and Shache (莎车; Yarkand). The Han Dynasty established the Protectorate of the Western Regions as a regional government between Yanqi and Kucha, to manage and control the Western Regions (Ma and Sun 1994). At this time, no information was recorded regarding the language of the local populations in the cities of Yanqi and Kucha.

There is no direct evidence for the connection between the Chawighul culture and the local population in 400 A.D. On the other hand, there was no significant population migration between 200 B.C. and 400 A.D that might have brought a new language into Loulan, Yanqi and Kucha (Ma and Sun 1994). Also, populations outside of this region all spoke other languages. In the northwest, the Wusun controlled the Valley of the Ili River. In the west, there were the Shule (疏勒) Kingdom in Kashgar and other Saka populations in Transoxania and the Ferghana Basin. In the east, Dunhuang and the Barkol grasslands remained a disputed area between the central Han government in the central plain and the nomadic powers in Mongolia. Apparently, none of these were the predecessors of the Tocharians. For these reasons, it is reasonable for us to deduce that the Tocharians in Loulan, Yanqi and Kucha were descendants of local populations having lived there since 200 B.C.; their possible direct connection to the Chawighul culture is not evident.

All possible archaeological cultures of the Tocharians originally were different from that of the Yuezhi (Guo 2012). As discussed above, the Barkol culture around the Barkol grasslands, the possible remains of the Yuezhi, was preceded by nomadic cultures in south central Mongolia and the Nanwan type of the Tianshan North Road culture in the Qumul Basin. Most of its elements developed from the Tianshan North Road culture. Other ancient cultures outside of the Qumul Basin and Barkol grasslands have no connection with the Tianshan North Road culture or its successors during the foundation process. The Xiaohe culture near Lop Nor proved to be associated originally with the Qiemuerqieke culture. The Xintala (新塔拉) culture in the Yanqi Basin and the Haladun remains in Kucha developed through influence from all the surrounding cultures. In a later period, the Chawighul culture showed even more complicated characteristics. The Qunbake (群巴克) and Zaghunluq cultures were previously considered a local type of the Chawighul culture in a different region. Now, however, it is clear that they are different cultures with different sources (Guo 2012). According to craniometrical analysis, the population in the tombs

of the Qunbake culture belong to an Indo-Afghan type of Caucasian that is a typical phenotype of the Saka population (Chen and Wang 2005). On the other hand, the population in the tombs of the Zaghunluq culture is similar to those of the Chawighul IV tombs and Gumugou tombs, belonging to an ancient European type of Caucasian (Zhang 2002).

## 9. Discussion

### 9.1 Evidence concerning the origin of the Tocharians

After the excavation of ancient mummies with European features in Xinjiang, dating up to 4000 ybp, the presence of an ancient genetic substratum of European origin was proposed to be relevant to the existence of an extinct Indo-European language, Tocharian. But up until now, no direct evidence has been detected regarding the genetic relationship between the speakers of Tocharian and ancient populations in Xinjiang.

The earliest manuscripts of Tocharian can be traced back to about 400 A.D. (Malzahn 2007). This language was spoken by populations in Yanqi and Kucha from the 4<sup>th</sup> to the 10<sup>th</sup> century A.D., approximately corresponding to the East Jin Dynasty, the Tang, and the Five Dynasties. It is possible that the Niya people spoke a form of Tocharian, but it is also possible that the language (Tocharian) was no longer spoken when the Niya Prakrit documents were written (3<sup>rd</sup>–4<sup>th</sup> century). As discussed above, it is reasonable for us to deduce that the Tocharians in Yanqi, Kucha and Krorän were descendants of local populations having lived there since 200 B.C. But no direct connection between the Tocharians and the ancient archaeological culture in this region – the Chawighul culture – is evident.

The Chawighul culture, lasting from 1000 B.C. to 200 B.C., is the predominant archaeological culture discovered in the Yanqi Basin and the surrounding region. In the west, the Qunbake culture in Kucha used to be considered a local type of the Chawighul culture. In the south, Zaghunluq, bordering the northern foot of Kunlun Mountain, also used to be thought of as a local type of the Chawighul culture. But according to the latest research, these should be treated as independent, different cultures. The origin of the Chawighul culture is complicated. The analysis of cultural elements shows that influences came from nearly all early cultures in the surrounding area – including the Xintala (新塔拉) remains, the Andronovo Complex, the Ake Tala (阿克塔拉) remains, the Qunbake culture, the Subeishi culture and the Sodungbrak culture. Furthermore, the relationship between these cultures and the earliest Bronze Age cultures in Xinjiang, such as the Xiaohe and Qiemuerqieke cultures, is still unclear.

## 9.2 Interaction and fusion of the Tocharians and Yuezhi

The relationship between the Tocharians and Yuezhi has been debated for more than a century. With all the evidence discussed above, we conclude that these two populations were of separate and distinct origin.

The original settlement of the Yuezhi is located between Tianshan Mountain and Dunhuang in the Gansu Province. Possible remains of the Yuezhi, Barkol culture, lasting from 1000 B.C. to 200 B.C., are different from all other archaeological cultural finds in Xinjiang.

At an earlier time, before 200 B.C., four Saka tribes moved westward and wrested control of Bactria from the Greeks. The Greek geographer Strabo records one of them as the Tokharoi (Tochari). The reason for this migration is unknown. According to some evidence, it is proposed that the Yuezhi once ruled a vast region ranging from the Gansu Province and Central Mongolia to the whole north part of Xinjiang. After 200 B.C., the Xiongnu expanded into Xinjiang and conquered most of the walled nation-states there. So it is possible that the westward movement of these Saka tribes was caused by the rise of Yuezhi power or the Xiongnu conquest in this region.

As mentioned in historical records, the country in Bactria conquered by the Yuezhi was named “Ta-Hsia” i.e., Daxia (大夏). Its people did not have a powerful king, and most of its cities were controlled by governors. Their soldiers were weak and cowardly in battle. These descriptions are somewhat inconsistent with a Greek kingdom, which would be expected to have strong armies. According to the records of Strabo, the central of the four tribes in this alliance were the Tokharoi (Tochari). It is generally accepted that “Ta-Hsia 大夏” is a rendering of “Tochar/Tachar”. After 130 B.C., the Yuezhi tribe crossed the Oxus River and ruled Bactria directly. Later, the Kushan Empire was established by the Kushan chieftom Xihao (翕侯; Yabgu). According to Chinese records, the Kushan chieftom developed from local Saka aboriginals rather than from one of the Yuezhi tribes. The Yuezhi were absorbed and disappeared from the historical record with the expansion of the Kushan Empire. The complicated history in this region may be an explanation for misunderstandings concerning the relationship between the Tocharians and the Yuezhi, but still more evidence is needed for a final resolution of this problem.

## 10. Conclusions

In this work, we have presented two ancient nomadic cultures that existed in the Barkol grasslands in northeast Xinjiang from 1000 B.C. to 200 B.C. Together with the historical records and a comparison of cultural elements, the Yuegongtai-Xiheigou sites group, which existed from 500 B.C. to 200 B.C., is proposed to be a remnant of the Yuezhi group. They were replaced by the Xiongnu population after 200 B.C., represented by the Heigouliang-Dongheigou sites.

Based on the time-space framework of cultural transition in ancient Xinjiang from ancient times to 200 B.C., we have discussed the relationship of these ancient cultures. We have summarized the relevant genetic data, and we have discussed the immigration into Xinjiang from different directions and the West-East genetic admixture in this region. Our genetic data shows that only East Eurasian paternal lineages were observed in the skeletal remains in the tombs of the Tianshan North Road culture and the Heigouliang sites on the grasslands of Barkol, which correlates with our cultural analysis.

Until now, the direct connection between the Tocharians and the ancient archaeological cultures in this region has continued to be unclear. Our study offers clues for discovering the ancestors of the Tocharians. The conclusion that can tentatively be drawn from the data presented here is that the Yuezhi people originally were different and separate from all other ancient cultures in Xinjiang, including those that may relate to the origin of the Tocharians.

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TOCHARIAN TEXTS IN CONTEXT  
INTERNATIONAL CONFERENCE ON TOCHARIAN  
MANUSCRIPTS AND SILK ROAD CULTURE

held June 26–28, 2013 in Vienna

Melanie Malzahn, Michaël Peyrot, Hannes Fellner and  
Theresa-Susanna Illés

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## **Preface**

When at the end of the 19th century the ancient Silk Road began to open again, it initiated the rediscovery of forgotten civilizations for the scholarly world. Among the manuscripts that were unearthed in Central Asia, the ones written in the two Tocharian languages led to the foundation of the new field of Tocharian studies and provided linguistics with a new branch of Indo-European. In the same way that the ancient Silk Road cultures were internationally orientated, mutually cooperative, and multilingual, Silk Road Studies and Tocharian Studies have to be interdisciplinary and collaborative. In order to make Tocharian texts more accessible to the scholarly community and to promote interdisciplinary research, the University of Vienna has been hosting an online edition project of Tocharian manuscripts, which is funded by the Austrian Science Fund (Y 492-G20), since 2011. From June 26 to 28, 2013, the same institutions generously sponsored the International Conference on Tocharian Manuscripts and Silk Road Culture: Tocharian Texts in Context, and they also made the publication of the present volume possible.

This volume collects twenty three conference papers ranging from Tocharian philology and linguistics to studies on Sanskrit, Uyghur, Middle Iranian, historical and archeological research on the region where Tocharian was spoken, and the history of Silk Road Studies and thus exemplifies the wide range of approaches in the field. In view of the diverse disciplines and scholarly traditions represented in the collection, we have not imposed a standardized model of transliteration or style on the papers.

It was in a spirit of international cooperation and mutual understanding, vivid in first millennium Turkestan societies, that Tocharian texts were written down at all, and it was due to the re-establishment of ancient ties that Tocharian texts were rediscovered; so we hope that connecting scholars and ideas in the present volume will lead to a better understanding of the lost Silk Road cultures.

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The editors